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[Founded in 1849 as the "Journal of Gas Lighting."]

Vol. CLVIII. No. 3079.] LONDON, MAY 17, 1922. [74th Year. Price 1s.

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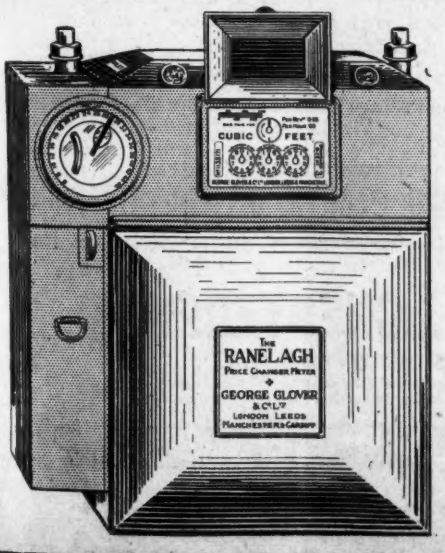

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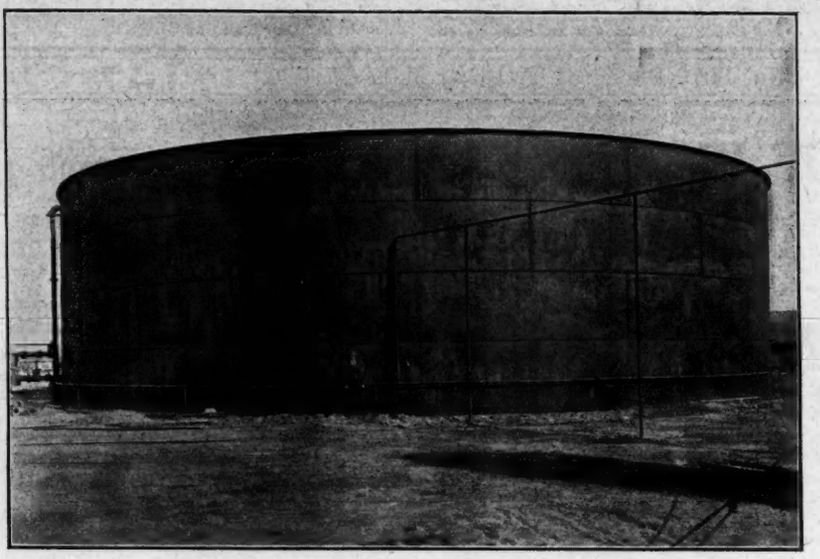

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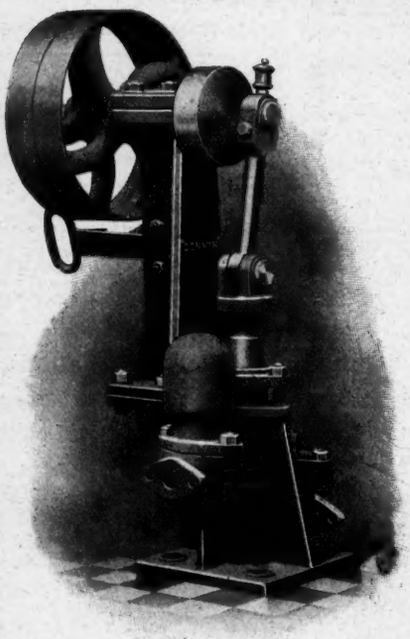

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VOL. CLVIII., No. 3079.] WEDNESDAY, MAY 17, 1922. [74TH YEAR.

EDITORIAL NOTES.

The Case for Reform in Private Bill Legislation.

THE Presidential Chair of the Society of British Gas Industries is this year occupied by the Right Hon. Lord Riddell. His Lordship, as is well known, has peculiar opportunities for taking a broad outlook upon the affairs of the nation and of men generally; and therefore his Presidential Address was much as it was anticipated it would be. It was addressed to men engaged in highly exacting technical classes of manufacture, and in greatly involved trading; and it is such men as those constituting the membership of the Society who know in their worst form the difficulties of industry, and the more or less considerable penalties of erroneous performance on their own part or of want of discrimination. Therefore, the members could appreciate much better than many others without their experience could have done the subject-matter of the address, which, brief though it was, was filled with thought and keenness of vision. It showed cause for freedom of private enterprise in industry and trading; cause for the limitation of State and municipal interference in trading; while acknowledging that there is much indebtedness to the local authorities of the country for what they have done in various directions appertaining to health. But the most pronounced feature of the address was the condemnation of myopic legislation, which has cast such a network of restriction over various industries and public utility undertakings. It was, to say the least, a gloomy review. It told of legislative muddle, of inappreciation of needs, of an unconscious disregard of that freedom which is necessary to the maximum of industrial prosperity. In other words, Parliament has shown that its machinery is totally unfitted to legislate, and so wholly inefficient in legislating, upon matters that require specialist, as distinct from political, knowledge. The politician needs (though he does not appear much to desire) the counsel of specialists, the ability to co-ordinate, and the power to discriminate with the view to variation where necessary to suit local circumstances and changes brought about by time. The address submits by illustration that, as things are, Parliament has definitely proved its own inability to legislate with the object of promoting the greatest well-being of the industrial and trading undertakings that come under statutory control. The maximum prosperity of such undertakings means the maximum prosperity of the country; but the indictment in the address of Private Bill legislation shows that Parliament has not testified to an appreciation of this.

From his examination of what has been done, Lord Riddell speaks of the necessity for the procedure affecting such legislation undergoing reform. He indicates how Parliament has never pursued any set or consistent policy. He speaks of the "confused and undecided action" of Parliament in respect of canal legislation, of the hampering of railways by undue restriction, of the crippling effect upon the electricity supply industry of the original legislation which provided for compulsory acquisition at the end of forty-two years on terms that are not characterized by generosity. He alludes to the history of the telephone system, which also "offers food for reflection," and refers to that of the tramways undertakings as "most depressing." In regard to the oldest public utility industry—gas—it seems to his Lordship that it has not suffered from Parliamentary restrictions so severely as most other utilities. Of course, there are limits to the knowledge and information of one even in the position of the President. This is seen in his references to both electricity and gas.

Speaking of electricity legislation, he said that recently, but somewhat late in the day, steps had been taken to remedy the failure to recognize that cheap power cannot be produced by companies working in restricted areas. Is the "remedy" the right one? We have spoken of the Legislature being advised by specialists. In framing the legislation to which Lord Riddell refers, Parliament was advised by an Electric Power Committee; but the only specialists upon that Committee were electrical. The mistake the Government then made was in not referring, irrespective of the agent, the whole question of power in relation to coal conservation to a Committee of experts representing the entire power interests. The so-called "remedy" (this is probably not known to Lord Riddell) has created a condition of things over which there is a greater cleavage of opinion in the electricity supply industry than there has ever been throughout its history. There is not the slightest knowledge whether the "remedy" is or is not going to cheapen electric power. Nor is the "remedy" in the form Parliament first designed for it. It was sought to revolutionize, and not to obtain the same end by the saner way of practical evolution. A very large part of the electricity industry as already created by the Legislature repudiates what has been done. In the practical judgment of many responsible expert electrical men, the Government are pursuing a wrong course. This brings us to the point that the constitution of an advisory body is highly important. It does not do to have such committees constituted of men of one pronounced view, any more than it would do to have a labour advisory committee composed only of ultraists in the labour world.

Then his Lordship says the "gas industry does not seem "to have suffered from parliamentary restrictions so severely "as most other public utilities." We are afraid that these words spring from inadequate knowledge of the history of the industry. A public utility undertaking should be allowed to operate in a manner which will confer the largest measure of utility upon the public. Until the year 1920, the gas industry was not permitted to develop itself in a manner that would confer the largest measure of benefit upon the community. It was tethered here, there, and everywhere. In no direction could it move without finding itself confined. This naturally curtailed enterprise. It was not until there was a reference by the Board of Trade to the disinterested body of experts constituting the Board of Fuel Research, that recommendations resulted that have given the gas industry greater power and liberty in technical development, which will mature to enlarged public service. The Gas Regulation Act is one of the strongest of condemnations of prior parliamentary restriction upon the gas industry. It is one of the wisest pieces of legislative work ever done for the industry. It has given a liberty which ought to have followed within reasonable time upon the appearance in public service of the incandescent gas-mantle.

To want of knowledge and inefficient parliamentary machinery is due the bad crop of legislation that retards industry and public utility concerns. All that Lord Riddell says about the incapacity of ever-changing parliamentary committees for dealing with the technicalities of statutory trading enterprises is completely justified. There is no consistent general policy to be seen in their findings; no co-ordination qualified by the demands of varying local conditions. By these ever-changing tribunals, strange contrasts in decision are given; and the gas industry has suffered in consequence. But an alteration has to some extent been effected. Under the Gas Regulation Act, and the power to issue Special Orders, decision regarding gas authorization is now largely a matter for a Department of the Board of Trade under a Director of Gas Administration. There we shall get the

benefit of consistency, with the necessary variation called for by local considerations; and this as the result of experience and ever-growing knowledge by one department specializing in the work. In respect of electrical powers, the Electricity Commissioners are now the responsible body. They cannot, however, operate, any more than can the Director of Gas Administration, outside the Act governing them. But the difference is that for the Gas Regulation Act, the Board of Fuel Research laid the foundation; and the Act itself is acceptable to the major part of the judgment of the gas industry. The Electricity Supply Act of 1919 had for its foundation the work of a body whose recommendations (as we have said) meant revolution, not evolution; and there is not the same measure of unanimity in acceptance in the electricity supply industry. It is to-day as a house divided against itself. However, in these two directions we have the genesis of change in our legislative procedure and machinery. What has so far been done in this respect is an improvement. Otherwise, on our part there is agreement without reservation with the words of Lord Riddell that "the whole system of Private Bill "legislation demands immediate reform. It is unworthy "of a great country like ours."

Turning the Corner.

There is abroad at the present time a feeling of certainty that industrially and commercially things are going to improve, though maybe gradually. We hope that the feeling of optimism that has been engendered in this respect will be not only maintained, but will grow, because optimism is a helpful factor in such a situation as that now existing. The feeling is fairly widespread. It has penetrated, if it does not altogether permeate, the membership of the Society of British Gas Industries, the firms constituting which are interested in the current engineering dispute, which has so much and so severely disturbed their operations that it had an adverse effect upon the attendance of members at the meeting last Thursday. There is good ground for the view —after the wise report that Sir William Mackenzie made upon his inquiry into the causes of the dispute in the engineering trade—that the lock-out upon the managerial question will be quickly brought to an end. The report was largely favourable to the employers' point of view; but in Sir William's opinion the matter is one in which no agreement, however carefully devised, can wholly take the place of good sense and goodwill between the parties, and an appreciation by either side of the point of view of the other. That is common sense; but while labour allows itself to be governed so considerably by men of extreme views, good sense and goodwill cannot possibly prevail.

However, looking round the labour world, it is found that, generally speaking, the lesson has been learnt that industry, subject as it is to economic laws, can only afford to pay a certain price at any time for labour, if it is to live and give employment. That lesson came poignantly after the heavy slump that followed the transient burst of work which succeeded the armistice; but there was resistance to the lesson and its material consequences. Hence the great troubles that have been experienced the last year or two. But the troubles have in large part spent themselves. In the coal, the cotton, and the shipbuilding industries, the inevitable has lately established itself; and superincumbent war payments on wages have been reduced. But unemployment is rife. The facts have caused a large relaxation of the resistance to restoration of wages on an economic level, for that is the only way to the restoration and maintenance of employment. Rates of exchange and international difficulties, of course, have their effects; but if the costs of production are at any time too high, they are a bar to such business as may be obtained in the markets of the world.

The Chairman of the Council of the Society of British Gas Industries (Alderman George Clark) was, at the meeting, quite confident regarding the outlook. He is convinced that, if we can get over the present labour troubles (we seem now in a fair way to doing so), and stabilize wages at any rate for a period, things will get back to a better tone—more work will be obtained, and the shops of the members will become much busier. With careful management, he believes that there will be industrial peace now for a very long time. With that peace, and the lower prices that will rule, there should be more work going in the gas industry. Everything looks bright in this direction, providing the basic need is satisfied—that the charge for gas is brought down to a lower level. Upon this, increased business in plant and appliances largely relies. Lower prices for gas depend upon the reduction of the charges it has to bear—capital, maintenance, working—for raw materials, and so forth, as well as upon the economies and efficiencies which can be realized in production through the plant and processes adopted. To some extent, therefore, the manufacturers of plant have to make contribution to the fundamental factors in the reduction to the consumers of prices per therm. The outlook, however, appears to us to be good. Prices of raw materials have declined; and there is a prospect of a further recession in therm prices. Railway rates, too, have receded from the highest levels. Gas is as popular as ever. Its place as a heating agent is gaining in strength by increased adoption. There is greater activity to-day in cultivating and fostering business—not only in the domestic line, but in industry. All improvement that there is in industry and trade generally will redound to the benefit of the gas-supply industry, and through it to the manufacturers of gas plant and gas-consuming appliances.

Taking all these things into consideration, and with the opportunities afforded by the Gas Regulation Act, we readily associate ourselves with the optimism of Alderman Clark. In doing this, we have good authority from the President of the Board of Trade (Mr. Stanley Baldwin). In a speech the other night in the House (when sitting as a Committee of Supply, and dealing with the vote for the Board of Trade), he referred to the present state of trade and industry, and ventured to forecast slow but gradual improvement. He is sure we have come to the turning in the long dreary lane. There is more productive power in this country than ever before; and the very best use has to be made of it. He examined one by one the signs of incipient improvement; and then he took separately the troubles (including burdensome taxation) by which industry and trade are obstructed. On balance, he finds good reason for confidence that matters industrially and commercially have begun to mend. It is for each and all to do his and their share in ensuring that the beginning develops into larger and larger volume, and this with an increased momentum—always subject, of course, to limiting circumstances.

Railway Rates Further Reduced.

The railway companies have yielded to the pressure put upon them, by industry throughout the country, to do something more than they did last January to assist trade by making further reductions in the costs of conveyance. In yielding, they have acted wisely, and particularly in making concessions which affect fundamental goods—such as coal and other raw materials. The reductions are very welcome. They always are. Every little helps. Manufacturers generally regard what has now been done as a step in the right direction; but the step is not long enough to give them complete satisfaction. The reductions are characterized as being far too small. But we must be fair, and not expect the railway companies to do what we cannot do ourselves through very similar causes. However, whatever the nature of the step (whether or not short of what it could be), it must be in some measure helpful to trade. The manufacturers would like to see the pre-war charges in operation again; but they know that this is impossible. The railway companies themselves point out that the charges are not likely to reach pre-war figures until working costs get down to more reasonable proportions. Manufacturers will hope that the "reasonable proportions" will not be long in being realized, though the fact has always to be borne in mind that, in respect of wages, when the sliding-scale arrangement has operated to its fullest extent, the standard rates will remain at a figure practically 100 p.ct. above the pre-war rates of pay. The reductions will become operative on May 22. In many cases the percentage increases over pre-war rates have been lowered by 25 p.ct., and a cut of 50 p.ct. has been made in collection and delivery charges—from 1s. 6d. to 9d. per ton. The flat rate on coal, coke, and patent fuel is to be reduced from 4d. to 3d. per ton; and the maximum addition is brought down from 4s. to 3s. 6d. per ton —the 3s. rate where now applicable being retained. The reductions that have been made in respect of the materials required for blast-furnaces and iron and steel works, and on the carriage of iron, steel, and tin plates, should have effect in bringing about some reduction of the prices of plant and goods. It is understood that the Mining Association are very disappointed with the reduction in the rates for coal;

and it is probable that their policy will be to press for further concessions. There is to be a meeting of the Association in London to-day.

Standardization of Cookers.

THE minutes of the Central Executive Board of the National Gas Council show that this matter is now well advanced. The report of the Committee and the specification have been approved and adopted; and so it may be presumed that before long more will be heard as to the details of the results of the investigation and constructive work. It is clear that the Central Executive Board are well pleased with what has been accomplished; for they have passed a vote of thanks to the Committee and the Sub-Committee for their care and trouble in making the inquiry. We can quite appreciate that there will be some feeling on the side of the stove manufacturers that this standardization work will affect much that they have done in the way of designing and improving. Without question, the new standardized cooker, having the imprimatur upon it of the National Gas Council, will have a good many adherents among gas undertakings; but we have not heard that there will be any preferential treatment of manufacturers in respect of the making of the standard cookers. Nor will gas undertakings be tied to the patronage of standard cookers. They will, as hitherto, suit their own inclinations and conveniences as to the purchase of this or that type of cooker. They will also no doubt be able to modernize, with advantage to efficiency, parts of many of their existing cookers to the standardized form. This is highly important, particularly in respect of hot-plates; for the designs of these, with the flame-intercepting and heat-transferring bars, are terrible and continuous depreciators of efficiency. Standardization, accompanied by improvement, is, of course, better late than never; but at this time of day, with so many cookers in existence, it will be long before standardization can materially affect the number of parts that must be carried in stock for cooker repair and renovation. It will, of course, have a gradual effect in bringing about reduction, but nothing more. Initially, it may actually enlarge the stocks of parts, as the standard cooker will be a new introduction. But a commencement in any reform has to be made somewhere.

The Corporation Tax.

TOWARDS the end of the editorial on "The Income-Tax" in last week's "JOURNAL," reference was made to the Corporation Tax, and to the claim to total exemption of public utility concerns, carrying on business under statutory control. It was then said (through reliance on a report that had been read) that the Chancellor of the Exchequer had not, in his Budget speech, given any indication as to what was likely to happen in this regard—as to whether there would be a prolongation of exemption, or permanent exemption, or whether unfortunately public utility concerns would unfairly be roped-in with ordinary trading enterprises which have to pay the tax. Reference to the "Parliamentary Debates," however, shows us that there is fortunately to be a continuation of the exemption for another three years. This is what Sir Robert Horne said: "It will be in the recollection of the "Committee that, when the Corporation Profits Tax was in- "troduced, there were exempted for a period of three years "from its provisions statutory companies, like railway com- "panies and other public utility undertakings. The period "expires on Dec. 31 of the present year; and since the con- "ditions which led to the exemption being granted are still "in existence, I propose that the exemption should be ex- "tended for a period of three years." The National Gas Council, and the organizations representing other public utility interests, are to be congratulated upon the success of their efforts in securing the further period of relief, which, after all, is only an act of justice in view of the circumstances under which such undertakings operate.

The Potteries Undertaking.

Save for Royal Assent, everything appears to be in order now for the transfer of the Potteries station of the British Gas Light Company to the Stoke-on-Trent Corporation. The Bill has passed examination by the Unopposed Bills Committees of both Houses. Since the last reference to the measure, the clauses affecting gas quality and price have undergone change, in the manner that will be found set forth in our "Parliamentary Intelligence."

Work of the Gas Referees.

It is a pleasure to see, from the minutes of the Central Executive Board of the National Gas Council, that the Gas Referees are evidencing a willingness, in making their rules and prescriptions, to hear all that can be said for or against them, or any acceptable suggestion as to improvement. An instance of this is the submission by the Referees to the Council of the draft report as to pressure testing, and their readiness to hear any representations that the Council wished to make for the consideration of the Referees. In setting to work afresh under a new condition of things, it is better to get matters as far as possible into a form which will ensure smooth working, and avoid discontent and bickering.

Price of Foreign Mantles.

British incandescent gas-mantle manufacturers complain that they are being subjected to unfair competition from imported mantles. It will be remembered that the Courts have held that mantles are not taxable under the Safeguarding of Industries Act. It is therefore quite conceivable that, in view of the relation in value of sterling to German currency, German productions can be sold at prices below those at which mantles can be made in this country. It is also submitted by the home manufacturers that employment in the industry is being, or is likely to be, affected through this condition of affairs. In consequence of this, the matter has been referred by the Board of Trade to a Committee for consideration; and at the end of this month they will be receiving evidence.

Gas Coal Position.

One of the features of the coal markets last week—particularly in Durham and Northumberland, Yorkshire, and Scotland—was the fairly considerable buying of gas and other coal by Germany; this applying especially to the unscreened and secondary varieties. In Durham, gas coals are particularly strong; and there the secondary qualities are feeling the effect of this—to their advantage. Prices from 24s. to 26s. were being realized last week for the best classes; while 22s. is the general quotation for second class. In Yorkshire, too, the supplies of the best qualities of gas coals are only about equal to the demand; but there the secondary classes are not in such good case. In most of the other fields, the movement in gas coals is quite leisurely.

Smoke Abatement.

One of the things that Lord Newton is fully minded shall not occur is that the report of the Committee of which he was Chairman, and which dealt with the subject of Smoke and Noxious Vapours Abatement, shall be pigeon-holed, and no action taken upon it. It will be remembered that gas-heating obtained quite a good place and recommendation in the report. He has raised the point on one or two occasions as to what is being done to make the report effective. Now we see that the Earl of Plymouth has been asking the Government whether they contemplate legislation upon the report. The Earl of Onslow, who is Parliamentary Secretary to the Ministry of Health, has intimated that it is proposed to introduce a Bill in the House of Lords in the present session; but whether the House of Commons will find time to deal with it, is a question the next few months can alone settle. Anyway it will be interesting to see the character and purposes of the proposed Bill.

Electricity Supply Bill.

In view of the second reading of this Bill in the House of Commons, a deputation of the London County Council have had an interview with the London members of Parliament with the object of enlisting their support for the measure. The Council are very much in favour of consolidating electricity generation in London and Greater London, patently because they are desirous of attaining something like supremacy in control. The Council pointed out that the designs of the Act of 1919 and the work of the Electricity Commissioners are handicapped by the want of the financial powers which the Bill proposes to confer. They regard the prices for current for lighting and power in London as dear, and attribute this state of things to the relative smallness of the generating stations. They contend that only by effective co-operation can urgently needed reform be carried out for many years. On the other hand, there are members of Parliament

who are making an effort to secure the rejection of the Bill; and some of them are interested in London electricity supply—Mr. George Balfour being one. The discussion on the motion for the second reading of the Bill was commenced on Monday night, but was still proceeding when the House adjourned at eleven o'clock.

Report on the Engineering Dispute.

Although there was no outward change last week in the engineering dispute, there was much private activity. The report of Sir William Mackenzie on the causes of the dispute was laid on the table of the House of Commons on Wednesday; and when its contents became known, it had a stimulating effect in the right direction. Sir William was not acting in the position of arbitrator, so that his conclusions have no effect other than of a moral or persuasive nature. It was an impartial review of the causes and of his impressions after hearing the evidence from both sides; and it raises questions which neither side can afford to ignore in the fresh negotiations, which were resumed yesterday. A brief reference is made to the report in the editorial article headed "Turning the Corner." In Sir William's opinion, the matter is one in which no agreement, however carefully devised, can wholly take the place of good sense and goodwill between the parties, and an appreciation by either side of the difficulties and point of view of the other. The managing of a business is a responsible and difficult task, and no individual workman or trade union official should unnecessarily, or without good cause, add to its anxieties. Similarly, each employer, and those acting under him, should recognize that the workman, in his more restricted sphere, is conscious that issues are sometimes at stake which are of the utmost importance to him, and upon which consultation, and, as far as possible, accommodation may be the wisest as well as the most humane, policy.

Changes and Overtime.

Several points are dealt with in the report which have been the subject of ineffectual discussion between the parties. Generally speaking, their tenour is that, while there must be freedom to the management to introduce such changes into the works as may be necessary for the proper development of industry, information as to proposed changes in recognized working conditions should be given to the men, so as to afford an opportunity for prior consultation between the management and the men principally concerned. Of course, the changes referred to do not relate to such matters as wages and hours, which are determined in the engineering industry on a national basis. More particularly as to the subject of overtime, Sir William says the question of necessity in regard to overtime is related to the requirements of the work to be done and the business in hand; and as to this necessity the management alone are in a position to judge. The national agreement of September, 1920, allowing thirty hours in four weeks, implies that, up to that limit, overtime (granted its necessity) is regarded as reasonable. Up to that limit, there must be freedom to the management to act in the exercise of their discretion. Beyond that limit, overtime would be open to the suggestion that it is unreasonable. The general limit of thirty hours is, of course, subject to further discussion; and if experience shows that the deterrent economic effect of the rate of time-and-a-half is inadequate to prevent unnecessary overtime, there is a case for further negotiation with a view to a revised national agreement. We do not see the need of any revision. In the fact that a wage rate of 50 p.ct. in excess of the ordinary wages has to be paid for overtime by the employers, one has the best possible deterrent from not only excessive, but all overtime. However, it is said that overtime is not likely to be a stumbling-block in the renewed negotiations. The chances of success this time are assisted by two considerations. In the first place, the Amalgamated Engineering Union, having failed to obtain sanction to impose a 5s. levy on working members, has reduced the dispute pay from 20s. to 10s. per week. In the second place, the employers make no secret of their disappointment over the comparatively meagre results from the throwing-open of their works.

Chemistry of Non-Benzenoid Hydrocarbons.—We have received from the Chemical Catalog Company, of New York, a book on "The Chemistry of the Non-Benzenoid Hydrocarbons, and Their Simple Derivatives." It is by Dr. Benjamin T. Brooks, and is the first edition. The net price is $7, *plus* postage. A review will appear as early as possible.

PERSONAL.

Lieut.-Col. G. A. Strutt, of Brailsford Hall, Derby, has been elected a Director of the Derby Gas Company, in succession to the late Mr. W. H. Whiston.

We are glad to learn that Mr. James R. Duff, the Secretary and Manager of the Banbury Gas Light and Coke Company, was, at a meeting of the Directors on the 15th inst., invited to join the Board as Managing-Director, and accepted the position.

The Rector of the Imperial College of Science, Sir Alfred Keogh, is retiring at the end of the summer term. He is to be succeeded by Sir Thomas Henry Holland. It will be remembered that Sir Alfred is a Past-President of the Society of British Gas Industries.

On Thursday last, the staff of the Bolton Corporation Gas Department presented Mr. J. Corrigan, on his leaving the Lum Street works to take up the duties of Assistant Manager at the Penrith Gas-Works, with a copy of Meade's "Modern Gas-Works Practice," together with their expression of good wishes for his future progress.

FUNERAL OF SIR DANIEL F. GODDARD.

The funeral of Sir Daniel Ford Goddard, whose death we had unhappily to record in last week's "Journal," took place on Wednesday afternoon, when all classes in Ipswich united to demonstrate the love and respect felt for the deceased. The first portion of the service was held in the Social Settlement Hall—a part of the large institution of which he was the generous donor, and in which he did so much good work. The Mayor and Corporation assembled at the Memorial Hall, whence they proceeded to the Settlement, headed by the sword and mace, draped in crêpe, his Worship wearing his robes and chain.

The Directors of the Ipswich Gas Light Company present included Mr. Hugh Turner (Deputy-Chairman), Mr. Henry Woodall (who was also a colleague of Sir Daniel on the Boards of the Gas Light and Coke Company and the Tottenham and District Company), Mr. F. Corder, Mr. H. Miller, Mr. G. H. Hewetson, Mr. Frank Prentice (Engineer), and Mr. G. A. Mallett (Secretary). The latter two gentlemen had been closely identified with Sir Daniel in the work of the Settlement since its commencement. The other officers of the Company, and the employees to the number of some 200, attended. Among other members of the industry were Mr. Thomas Goulden, Past-President of the Institution of Gas Engineers; Mr. J. L. Godlee (Director), Mr. W. L. Galbraith (Secretary), and Mr. E. J. Foot (Assistant General Manager), of the Gas Light and Coke Company; Mr. William Cash, Bournemouth Gas and Water Company and South African Lighting Association; Mr. A. E. Broadberry (Engineer) and Mr. E. J. K. Fussell (Secretary), Tottenham District Light, Heat, and Power Company; Mr. Harry E. Jones; Mr. Corbett W. Woodall; Mr. J. S. Garrard, Secretary of the Eastbourne Gas Company, who was formerly associated with Sir Daniel in the Ipswich Gas Light Company; Mr. W. M. Mason, the Manager of the British Commercial Gas Association; Mr. Thomas Cochrane; Mr. G. J. Steward, of the Gas Purification and Chemical Company; Mr. C. T. King, of Messrs. W. B. King & Co.; and Mr. E. C. Sayer, the Borough Gas Inspector.

There were many beautiful floral tributes.

Water Gas from Bituminous Coal.

The use of bituminous coals—especially coals mined in Illinois and Indiana—for water-gas generator fuel, received quite an impetus during the war; and under certain plant and economic conditions the financial saving derived from its use was appreciable even when coke from Eastern coals again became plentiful. Many operating difficulties (some of which have been overcome to a great extent) were encountered with bituminous coal; and these were discussed in a paper read before the Illinois Gas Association by Mr. W. A. Dunkley, who described experiments made at the plant of the Coal Products Manufacturing Company, at Joliet, under a co-operative agreement between the Bureau of Mines and other bodies. The Illinois Gas Association bore the expenses of Mr. Dunkley during the investigation. The installation consists of four water-gas sets, of 3½ million c.ft. per day capacity each, using good coke and 42 in. blast pressure. Three of the sets can be used at one time, in conjunction with three waste-heat boilers, which are arranged to handle both the make gas and the blast gas from the sets. The sets are entirely operated by automatic controls, which system keeps the length of each part of the operating cycle very uniform. Operating under conditions described in the paper resulted in the recovery of approximately 60 p.ct. of the heat input in the finished gas, tar, and solid residues from the sets. The waste-heat boilers recovered slightly over 9 p.ct. additional heat during the test. Now a recovery of about 12 p.ct. of the heat input in the steam generated is indicated. It is pointed out that the purpose of the paper was neither to deprecate nor defend the use of coal as generator fuel. One thing to which attention is drawn is that the fuel blown over from the generators to the checker chambers was a nuisance and source of loss. It amounted to nearly 5 p.ct. of the heat input to the installation. The recovered fuel can be used as boiler fuel, but not very efficiently.

ELECTRICITY SUPPLY MEMORANDA.

Exhibitions.

VARIOUS electrical undertakings have been holding exhibitions recently. They have got over the winter peak-load, and are now looking for business to help to raise the level of the valleys representing, in residential areas, the summer load. We took the opportunity lately, while in the neighbourhood of one of these exhibitions, of looking in, to see what was going on. The exhibits were mostly of the small domestic order. It had been hoped that more would be seen in the electric-cooker line, and in bulk water heating by electricity. We wanted to hear what the salesmen themselves had to say about these things. But there was disappointment. Vacuum cleaners and irons were very prominent; and there were kettles—self-contained ones and in abundance, at a price. There was also the new type of reflector fires—with a bowl reflector, and an incandescent element standing-out aggressively from the centre. Concentration of the kind is not the best form for distributing radiant heat. There were one or two cookers of the light and flimsy order. There was an electric laundry; the chief claim to the title of "electric" being that the motive power was by electricity, and the irons were electrically heated. There were one or two cookers; but they were small flimsy-looking structures. They were the last thing that the man in charge seemed desirous of talking about. So we heard what he had to say regarding the current consumption of flat-irons at power rates—not, as customarily, off the lighting circuit at lighting prices—and passed on. As a matter of fact, we did not see anything that could be called new in the exhibition. There has not been for some time now noticeable development of anything that can be described as novel in the domestic electric line; and efficiencies do not seem to improve—in fact, with electric-heaters, if true that they have 100 p.ct. efficiency (which they have not), the only scope for economy is through price.

Free Trial of Cookers.

Talking of exhibitions and cookers—the Hackney Electricity Department has been holding one; and out of it comes something of a novelty in the methods for developing the electric-cooker business. The Electrical Engineer is Mr. L. L. Robinson, who has adopted as a sort of business maxim that, if one wishes to develop the domestic load, one must show confidence to the consumers. It is in the method that Mr. Robinson has adopted to show his confidence that there is novelty. He is going to lend out forty (perhaps more) electric-cookers free for three months, without any financial liability on the consumers, other than that they must pay at the ordinary rates for the electricity used during the trial. Gas officials should note the conditions of the trial. The consumer must be a rate-payer in Hackney, and a user of electricity for lighting and of gas for cooking. This means that electricity and gas are to be brought into direct comparison. We would make a suggestion here—that the gas be disconnected entirely, so that all boiling operations have to be carried out electrically. Another point particularly interesting to gas men is that at the end of the trial the consumer is to give a written report to the Electricity Department upon the relative advantages of electricity and gas for cooking. This report is to become the property of the Council, with the right of publication. Advertisement is at the back of this scheme; but we may be sure that the reports will not be published if not thoroughly favourable, and that the Electricity Department will look well after the cookers during the course of the trial. If an applicant for an electric-cooker for free trial is a holder of any class of gas debentures or shares, apparently he is to be regarded as a suspect or prejudiced person. A condition says: "The consumer must not be a holder of any class of gas company debentures or shares." It does not state what will happen if he is also a holder of electricity debentures or shares. This may make him a disinterested person. If at the end of the trial the consumer does not desire to continue the use of electric cooking, he must allow the Council to remove the cooker and wiring at their own expense. If he desires to continue the use of electric cooking, from that date, he is to pay such hire or cost price as shall have been quoted to him when he accepts the offer. It is stated that, before the end of the third day of the exhibition, the first twenty cookers were booked; and it was then the number was increased to forty. Mr. Robinson says he finds that "people are fed-up by being told by the competitors how expensive electricity is. They simply won't believe it any longer. They want the best, and mean to have it." Apparently they are satisfied they have got the best, if the evidence of gas-cooker use stands for anything, in view of the fact that electric-cookers have been pushed during the past twenty years. Notwithstanding, in the year 1922, Mr. Robinson has to give free trials of electric cookers to people who do not "believe" what the "competitors" say, and so it may be presumed are of opinion that electric-cookers are the best. It is a curious sort of belief that requires such confirmation as this. There is something wrong here. However, if history repeats itself, there will be in Hackney several users of electric-cookers who will revert to the gas-cooker, which, as already said, ought to be totally disconnected, in order to get a fair comparison, and not be used as a stand-by, and for boiling operations, during the run of the trial.

Stand-By Clauses.

In the "Memoranda" last week, reference was made to the view of certain electrical contemporaries, that the Gas Light and Coke Company, if allowed the stand-by clause which they are seeking in their Special Order, would have the power to use the clause oppressively where a consumer only desired gas for part of his service and electricity for another part. We have not seen any objection in these same electrical contemporaries to the amendment, proposed in the Electricity Supply Bill, of section 15 of the Electric Lighting Act of 1909. That section gives the power to impose a minimum charge where premises have an alternative supply of electricity. In the Bill now before Parliament, it is desired to extend the scope of the clause. It is contemplated that the clause shall have effect as if the expression "premises having a separate supply" included premises which have a separate supply of electricity, or on which a separate supply of gas, steam, or other form of energy is in use, or ready for use, for the purposes for which electricity is demanded or received. Now we cannot conceive of a clause which would better enable electricity undertakings to compete unfairly with gas undertakings. It would enable them severely to penalize consumers who, for instance, find it convenient to use gas for heating and electricity for lighting. Yet the fault-finding electrical journalists complain of the stand-by clause in the Gas Light Company's Special Order! Here, for electricity, one is proposed that will apply to all electricity undertakings, and confer power to do precisely the same as it is surmised the Gas Light Company would be able to do (did they so desire) under their Special Order. Moreover, there is an important point of difference between the clauses. The Gas Light one provides for a minimum payment not exceeding 25s. per quarter. The clause in the Electric Lighting Act of 1909 does not (and will not as amended by the Bill) provide for a definite limit beyond which the minimum charge may not go.

An Experiment on Tenants.

The London County Council are going to inflict an experiment on the tenants of the dwellings on the Goldsmith's Row site, under what is known as the Brady Street housing scheme. Owing to the heavy initial cost, it has not hitherto been found practicable to adopt electricity as a lighting medium in connection with the Council's housing schemes; but for these particular dwellings, which will contain only twelve tenements, it seems that the Shoreditch Borough Council are willing to indulge in a little speculation. The Committee of the County Council concerned in the matter are of opinion that the scheme will be useful and interesting. Perhaps it will be—providing it is a proved commercial transaction. It amounts to this: The Borough Council have offered to make a complete installation for lighting, cooking, and water-heating, subject to the County Council bearing one-half (£15 per tenement) of the total cost. The tenant would pay a flat rate for the current for lighting and water-heating; the weekly charge for a three or four roomed tenement being 2s., and for a five-roomed tenement 2s. 4d. It seems that, when the current is not in use for lighting purposes, it will automatically operate to heat water in the heater provided. This is a curious arrangement. The heat available for heating water will depend on the amount of light used. There is no information which will allow us to gauge the probable amount of current that will be at liberty for the purpose. If one only knew this, it would be possible to estimate the quantity of hot water the tenants would be able to obtain. It is seen that the apparatus is to remain the property of the Borough Council. After allowing for capital charges and maintenance, the payment for the current, and other incidental expenses, there cannot be much profit in the £5 4s.—the annual revenue at 2s. per week. It is said that the maximum amount of water available at any one time would be 4½ to 5 gallons at a temperature of 140° Fahr. It would require a fairly considerable amount of current to maintain even 4½ to 5 gallons of water at a temperature of 140°. To heat-up 5 gallons alone, from (say) 50° to 140°, would, without heat losses, require 4500 B.Th.U., or nearly 1½ units. But there are no electric water-heating appliances which have 100 p.ct. efficiency, and a capacity for retaining all the heat without loss. Therefore we rather fancy the tenants in the dwellings will think this water heating by electricity is a bit of a "frost," particularly if they have hitherto had the advantage of securing hot water quickly by means of a gas boiling-ring. Another part of the experiment is cooking. The current for this purpose is to be supplied separately, and charged for at the rate of 2d. per unit, which will involve the use of a meter. But the apparatus, though the County Council are paying half the cost of the installation (£15 a tenement), is to remain the property of the Borough Council. We see that the Gas Light and Coke Company were willing to instal gas lighting and cooking apparatus, subject to the County Council paying £7 10s. a tenement—not £15—but the Committee say the gas installation would involve expenditure in cutting-away brickwork and making good, which would bring the total cost to a figure greater than that involved in installing electricity.

Electric Boiling-Plates.

According to "Cooking and Heating Notes" in the "Electrical Times," notable advances have been made in electric boiling-plates. It is about time that this came about, if electrical people hope to do any real good with the

popularization of electric cooking generally. It is admitted that the boiling-plate was the weakest link in the chain of electrical domestic appliances. Collapses have been frequent, and almost heart-breaking, occurrences—not only to the user, but to the electricity supplier. To-day, however, we read that "in reliability the boiling-plate is comparable with the electric oven and grill," which is not saying much. In thermal efficiency, too, it is asserted improvement is no less marked. The writer later refers to one of the latest enclosed types of "Tricity" plate, with ground cast-iron top and sheet-metal body. The total loading of one of these plates is 900 watts; and a "rough" test is alluded to, in which 3 pints of water were boiled in a cast-iron saucepan, which gave "76 p.ct. as the overall thermal efficiency of the plate." To raise 3 pints of water at 50° Fahr. to boiling-point would require the transmission to the water of 607 B.Th.U. This, representing 76 p.ct. efficiency, would mean the expenditure of 800 B.Th.U., or nearly a quarter of a unit. This is not exactly cheap with current at 2d. per unit; and the time occupied, at the rate of 900 watts per hour, would be sixteen minutes. Under better conditions of test, the writer in our contemporary thinks that a more favourable result would be obtained. Experience of electric hot-plates is that the efficiency falls-off considerably with use. We take it that the "76 p.ct. efficiency" was obtained with a new, or comparatively new, plate. We should like to see what would happen to one of these plates after ordinary kitchen usage for a few weeks. Past experience suggests that there would be something missing from that 76 p.ct. efficiency.

Unstable Industrial Loads.

At one time, there was nothing like an industrial load. It is all right now, so long as it runs ahead continuously. But electricity concerns are now finding that an industrial load is not an unmixed blessing. Strikes and slumps in trade are constantly recurring; and during these there is a heavy downward slide in the demand for power purposes. While this is going on, all the plant provision that has been made for industrial load is "eating its head off" in capital charges. One establishment may take a big supply; but a bit of bad luck may reduce its requirements considerably. Hence the view is growing that the industrial load has its drawbacks, and is not so stable as is desirable. Electrical writers are therefore looking round for something more stable; and they are utilizing the instability of the industrial load as an argument for prosecuting the development of the domestic load for purposes other than lighting. Mr. W. A. Gillott was pursuing this line in the article upon which we commented last week, and "Electrical Industries," taking its cue from Mr. Gillott, says that "present conditions may induce undertakings to reconsider the problem on a better basis than the crude argument that power business is big and domestic business small. There have been heavy drops in output; and there is little hope of any compensation in the early future from the industrial demand alone. The virtues of a stable domestic load are consequently better appreciated." It is therefore hoped by our contemporary that Mr. Gillott's argument will induce central station engineers to do something better than collect reasons for not troubling themselves to take up electric cooking. Electric cooking is not a stable load. It is in many districts a load that is heaped-up in a short space of time; and even this is not the same day by day. Electric heating is only seasonal; and washing days come, as a rule, only once a week.

NATIONAL GAS COUNCIL.

Meeting of the Central Executive Board.

A meeting of the Central Executive Board of the National Gas Council was held on the 9th inst., with Mr. D. Milne Watson in the chair.

The President announced with very great regret the death of the Rt. Hon. Sir Daniel Ford Goddard, and paid a tribute to the great work Sir Daniel had accomplished for the gas industry. Mr. Milne Watson said that all those who had been privileged to come in contact with Sir Daniel Goddard would miss his bright and cheerful personality. A vote of sympathy was passed—all the members standing.

Standardization of Cookers.

The report submitted by the Committee of the Council which had been appointed to deal with this matter was approved and adopted. A vote of thanks was passed to the members of the Committee and Sub-Commitee for the great care and trouble taken with regard to the investigations. It was decided to proceed with the matter without delay upon the lines of the recommendations.

Prices paid for Spent Oxide and Sulphuric Acid.

This matter was carefully considered, and the necessity for an immediate further reduction in the price of sulphuric acid was considered imperative. Instructions were given that a summary of the prices at present being paid for sulphuric acid and received for spent oxide, as communicated to the Council by their members, should be referred to the District Secretaries.

Provisional Prescription of the Gas Referees—Pressure Testing.

It was reported that at a meeting held that morning of the Committee appointed by the Council for the purpose of discussing this matter, the draft report received by the Council from the Gas Referees had been carefully considered. At an interview with the Gas Referees held prior to the meeting, the representations of the Council were stated, and received sympathetically. It is hoped that the Council will have an opportunity of considering the revised draft of the proposed Provisional Prescription of the Gas Referees with regard to pressure testing before it is issued.

Rating Assessments.

Complaints to the Council with regard to this subject were reported; and it was decided that, if possible, steps should be taken to assist members of the Council in connection with this question. The Managers were requested to make inquiries and to report.

Half-Yearly Report and Accounts.

The half-yearly report to March 31 was submitted, amended, and approved, together with the accounts for the corresponding period. It was agreed that the half-yearly report should be published in the Council's monthly report instead of being issued as a separate statement.

British Engineering Standards Association.

It was reported by one of the members that his undertaking had been invited by the Association to appoint a representative on the Sub-Committee considering the British Standard Specification for cast-iron pipes for gas, water, and sewage. He thought it would be preferable to ask the Sub-Committee to receive evidence on behalf of the Council. This suggestion was much appreciated and adopted by the Board, who decided to ask the Institution of Gas Engineers to take such steps as they considered necessary, in order to obtain the views of the industry generally with regard to this specification.

Factory and Workshop Act—Draft Regulations.

The Sub-Committee dealing with this question had further considered the revised draft, and had suggested to the Home Office that it should be amended by exempting certain processes carried on in gas-works, save in special cases. A communication from the Home Office dated May 4 was reported declining to accept the amendment proposed, but stating the Chief Inspector of Factories would grant certificates of exemption in suitable cases.

British Empire Exhibition, 1924.

A request was reported from the promoters of this Exhibition for subscriptions towards a guarantee fund from gas undertakings.

GAS CHEMISTS' HANDBOOK.*

According to the preface of the first edition, this book was compiled by the Chemical Committee of the American Gas Association in response to the need for the establishment of uniform agreed methods of testing and chemical analysis to facilitate the commercial transactions and also the day-to-day control in the gas industry. Intended to cover practically all the wants of the practising gas chemist, it is divided into four chapters: I. Raw materials—coal, coke, gas oil and purification materials. II. Products of gas manufacture—gas, ammonia, tar and its constituents, cyanogen. III. Impurities in gas—sulphur, ammonia, tar, naphthalene, carbon bisulphide, and iron carbonyl. IV. Miscellaneous—water, paint, lubricants, solder, bearing metals, brass and bronze, pipe deposits, refractories, cement and lime, iron and steel.

The second edition is almost double the size of the first, being amplified in many important respects, some of which are indicated later.

In appraising a book like this (produced abroad) it is necessary to examine it from two different standpoints. One must consider both its intrinsic merits as a trustworthy scientific and literary production, and also its usefulness to "Journal" readers, who are primarily British gas engineers and chemists.

It is necessary to say at once that the usefulness of the work to British chemists is limited by the fact that much of the special apparatus and many of the methods are not in vogue in this country. It is very notable that technical analytical practice is influenced by national prejudice or custom; but an inspection of the laboratories and technical literature of different countries reveals the tendency of the chemist to cleave to the methods and apparatus due to, or recommended by, his compatriots. This in itself is not an evil. If the principles underlying a test are sound, and the execution is in the hands of a competent craftsman, good work will usually be done. These conservative proclivities, however, do not facilitate the internationalization of standard methods. No better example is to be found than the book under review, which for this reason cannot become a standard of British gas chemical practice. The methods described are frequently unfamiliar, and much of the apparatus of American design cannot even be purchased in this country. The different conditions of the American gas industry are reflected by the contents of the book. A noteworthy feature is the absence of any reference to

* The Gas Chemists' Handbook. (Second Edition.) Published by the American Gas Association, No. 130, East Fifteenth Street, New York; pp. 608; illustrations 113; tables 31. Price, $6.00 U.S. and Canada; $6.50 other countries.

photometry; and for this omission no reason is assigned, though illumination standards are still operative in America.

So far as its intrinsic merits are concerned, the book is to be highly commended. The twenty-nine chemists responsible for its production comprise gentlemen well known in their profession, and they have added another to the numerous excellent analytical works which American chemists have produced. This book is not a hasty compilation without discrimination and selection, but a collection of proved and established methods always made with an eye to the conditions of the gas-works. This is evident at the beginning, in the section on sampling raw materials. The various conditions in which a parcel may have to be sampled in practice are foreseen and dealt with in detail. A notable omission is the definition of the size of mesh when specifying the sieves employed in sampling—an important matter in dealing with the finer sieves. The methods of sampling and analysis of coal have been the subject of much experimental study on the part of the United States Bureau; and the recommendations of these official bodies have been incorporated. An excellent feature of the instructions for making proximate analysis is the statement of permissible tolerances for experimental error as between duplicates by the same worker and by different observers.

After this comes a section on the testing of gas oil, to which considerable prominence is naturally given in an American work. The usual, and some unusual, chemical and physical tests have been supplemented in this edition by a cracking test—a laboratory imitation of the carburetted water-gas plant. Provision is made for the generation of a current of water gas in which the oil under test is cracked at a red heat. The apparatus can be made to furnish "finished gas," which is said to agree in composition with that obtainable in practice. Incidentally, it is interesting to note that the carbon monoxide content of the "finished gas" in the example worked-out is 30·6 p.ct. The apparatus, which includes three 5 ft. and one 80 ft. gasholder, is evidently only suitable for large undertakings.

Chapter II. deals with the products of gas manufacture, and is considerably expanded as against the first edition. Much more space is devoted to gas analysis; and specially commendable is the stress laid upon the methods of sampling to be employed about gas plants. Several kinds of aspirating appliances are discussed, and methods for obtaining "grab" and continuous samples under various conditions. The complications attendant on the presence of tar fog, water vapour, and the uncertainty as to uniformity of composition in a flowing gas stream are all discussed. The important problems of sampling are often given too little prominence in works of analytical chemistry.

In the section on gas analysis, the difference between American and British practice is very evident. Over here the methods of precise gas analysis at constant volume—as exemplified by Bone and Wheeler's apparatus—have secured general favour. There is no hint of their existence in the book. Americans appear to favour the constant pressure methods of the Hempel and Orsat pattern with various refinements. Prominence is given to the measurement and characterization of the paraffin hydrocarbons in gas. The nature of the carburetted water gas is doubtless responsible. Fractional combustion methods are recommended, and convenient apparatus for the purpose is described.

It is noteworthy that the old effusimeter is recommended for determining the specific gravity of gas, though it received much criticism in a report of the United States Bureau of Standards. In the section on calorimetry, the use of the Junkers instrument alone is described, and the space devoted to the subject is not commensurate with its importance in the British gas-works.

The sensation of unfamiliarity is again marked in reading the section devoted to the analysis of benzole and tar products. During the late war, special methods of dealing with these were elaborated on this side, and of necessity widely practised. They have proved convenient, and reasonably precise in good hands, and are (though perhaps this may be due to the national prejudice mentioned above) in the writer's opinion, if anything, simpler in execution than those described. The use of copper in the construction of laboratory stills is recommended, though it has no apparent superiority over sheet steel acetylene welded, which is cheaper and has a longer working life.

Purification oxides receive considerable attention. The methods proposed for the analysis of spent oxide, however, differ materially from those standardized by the National Gas Council. In dealing with the determination of cyanides, the method of titration in the zinc sulphate only is retained. Determination by distillation according to the Feld or Williams methods—which have been found so convenient—are not mentioned, while thiocyanates are never even referred to in the whole book. This section certainly falls short of the requirements of the British gas industry, in which sulphocyanides play an important part.

A new feature of this edition is the section on refractories, which contains some interesting tests—*e.g.*, a load test, which is described in detail, together with drawings of the apparatus. Provision is made for examining the effort of heating a 9-in. brick under a load of 25 lbs. per sq. in., at temperatures up to 1500° C. There is included a spalling test for the checker-work of water-gas carburettors. The brick is alternately heated to 1350°C. and transferred to a trough of cold water for one minute, until the specimen breaks into two pieces. A ball test at 1350° C., analogous to the Brinell hardness test for metals, is also described. The common chemical and physical tests are also included.

Chapter IV. contains analytical methods for testing miscellaneous stores, paints, oil, cements, metals, and alloys, not usually included in a work on gas-works chemistry. At the end come over forty pages of tables, conversion factors, and various physical and chemical data which must add greatly to the usefulness and convenience of the work. Indeed it seems probable that the American gas chemist will rarely require to go beyond this handbook in his daily work.

In conclusion, the writer would say that the book is inherently, and particularly when viewed from an American standpoint, an excellent production. It is a great advance on the first edition, which he had previously found useful from time to time. It is substantially got-up and well printed, though perhaps rather high-priced when judged by British standards. It has, however, the limitation already indicated of not covering the requirements of British gas chemists. For them it does not furnish a comprehensive handbook for daily routine. It should, however, prove useful as a work of reference, and in that capacity may well be commended to those who wish to maintain a well-equipped laboratory bookshelf.

H. J. HODSMAN.

MIDLAND JUNIOR GAS ASSOCIATION.

Visit to the Summer Lane Station of the Birmingham Electric Supply Department.

By the kind permission of the City Electric Supply Committee, a visit was paid on Thursday, May 11, to the Summer Lane Generating Station, when about 45 members, led by the Junior Vice-President (Mr. L. H. Thomas) attended. The party also included Mr. T. F. E. Rhead, the Chief Chemist to the Birmingham Corporation Gas Department.

In the absence of Mr. R. A. Chattock, the City Electrical Engineer, the members were received by Mr. F. Forrest, Chief Assistant Engineer, who, with his assistants, Messrs. Sutton, Burges, and Morton, conducted the party round the station. The visit was of much interest; the up-to-date character of the plant and general equipment being a noteworthy feature. The present total capacity of the station is 34,000 K.W.; and the plant includes two 5000 K.W. turbo-alternators. The boiler section comprises 33 boilers, by Messrs. Babcock & Wilcox, Ltd., of their "Land" pattern water-tube type, fitted with patent double mechanical chain-grate stokers, and generating steam at 180 lbs. pressure. The station distributes direct current for lighting and private power purposes and for the overhead tramway system, and also high-tension three-phase alternating current to sub-stations. The very large diagram showing all stations and connecting mains, &c. —a necessity in general working as well as in cases of break-down—was of special interest.

At the conclusion of the visit,

Mr. L. H. THOMAS (Birmingham) proposed a hearty vote of thanks to the Electric Supply Committee and Mr. R. A. Chattock for granting permission for the visit, and to Mr. F. Forrest and his assistants for their kindness in showing the members round. They had spent a most interesting time in inspecting the plant of a competitive department.

The vote was seconded by Mr. A. BRITTEN (Swan Village) and warmly accorded.

Mr. F. FORREST, in reply, apologized for the absence of Mr. R. A. Chattock, who was prevented by an important appointment from attending the visit. He said that there was room at the present time for both electricity and gas in modern industry, and it was up to all of them to work together to achieve a closer co-operation than had been apparent in the past. Their efforts were for a good cause, and could result in nothing but benefit to their city.

Manchester District Institution of Gas Engineers.—There is to be a meeting of the Institution (under the presidency of Mr. Harold Davies, of Chesterfield) at Barnsley, on Friday, May 26, to inspect the low-temperature carbonizing works at Barugh, the coke-ovens and bye-products works of the Old Silkstone Colliery Company, and (if time permits) the Yorkshire Electric Company's power station—all the plants being in close proximity to each other. The Old Silkstone Colliery Company have invited the members to lunch. The arrival at Barnsley should be as near as possible to 11.30.

Midland Association of Gas Engineers and Managers.—As previously intimated, the spring general meeting of the Association will be held at Wolverhampton, on the invitation of the President (Mr. W. H. Adams, of Bilston), on the 25th inst. The members will assemble at the Victoria Hotel (which is only two minutes' walk from the station) at 1 o'clock, where they will be received by the President and the Chairman fo the Bilston Gas Company, who will entertain them at luncheon. Immediately after lunch, a short business meeting will be held. At 2.30 trams will convey the visitors to the Wolverhampton Gas Company's works, on the invitation of the Engineer (Mr. P. G. Winstanley) and his Directors. The works will be inspected under the guidance of the Engineer and his assistants. After the inspection, the members are invited to take tea with the President and Mrs. Adams, which will be served at the Queen's Picture House, at 4.45. This will be a day of considerable interest to the members, and, given fine weather, a very enjoyable one.

SOCIETY OF BRITISH GAS INDUSTRIES.

ANNUAL GENERAL MEETING.

The Annual General Meeting of the Society—which was very well attended—was held last Thursday afternoon at the Hotel Cecil, Victoria Embankment, W.C. During the general business meeting the chair was occupied by Alderman George Clark, J.P., M.Inst.Mech.E. (the Chairman of the Council). Subsequently the chair was taken by the Rt. Hon. Lord Riddell (the President), who delivered his address.

Letters of regret had been received from the following gentlemen who were unable to attend: The Marquess of Hartington, Lord Weir of Eastwood, Sir Dugald Clerk, Sir Robert Hadfield, Lieut.-General Sir Alfred Keogh, Prof. Arthur Smithells, Prof. Harold B. Dixon, Mr. D. Milne Watson, Prof. John W. Cobb, and Mr. James D. Smith and Mr. Samuel Tagg (Vice-Presidents of the Institution of Gas Engineers).

Minutes of Last Meeting.

On the proposition of the Chairman (Alderman George Clark), the minutes of the last meeting were taken as read, confirmed, and signed.

Report of the Council.

The Council presented the following sixteenth annual report, dated April 4, and signed by the Chairman (Alderman George Clark), on the work of the Society for the year 1921-22.

It is with much regret that we have to refer to the great loss which the Society has sustained by the death of Mr. J. H. Balfour Browne, K.C., one of our highly esteemed Past-Presidents, who had rendered us such valuable services, and at the time of his passing away was our President-elect. We have also to record with regret the death of the following members:

John West, Chairman of West's Gas Improvement Co., Ltd.
John Mackay, a Director of Alder and Mackay, Ltd.—one of the Founders of the Society.
A. D. Nicol, a Director of James Milne & Son, Ltd.
Sir Thomas Wrightson, Bart., Chairman of Head, Wrightson, & Co., Ltd.
Richard T. Glover, late Chairman of Glover and Main, Ltd.
William Cowan, late Chairman of Parkinson and W. & B. Cowan, Ltd.
Thomas Duxbury, head of the firm of Thomas Duxbury & Co.
John Delaney, Chairman and Managing-Director of W. J. Jenkins & Co., Ltd.
Edward T. Wright, Senior Partner of Westwood and Wrights.
Alexander Young, Managing-Director of R. Laidlaw & Son (Edinburgh), Ltd.

The Society wishes to offer its congratulations to the following gentlemen:

Sir Dugald Clerk, K.B.E., F.R.S., who has had the degree of Doctor of Laws conferred upon him by the University of Glasgow.
Sir Robert Hadfield, Bart., F.R.S., who has had the Order of the Sacred Treasure (Japan) Insignia Second Class conferred on him for war services.

Owing to the miners' strike last year, our annual meeting was deferred until Oct. 5, 1921. Only seven months having since elapsed, there is not much to report as to the activities of the Society at this year's meeting.

At the time of writing this report, those of us who are more closely connected with mechanical engineering are in the midst of a lock-out on the question of managerial control. In fact, ever since the armistice in 1918 the trade of this country has been continually disturbed by trade disputes, which have not helped in the re-establishment of industry. Many will agree that nearly all the labour troubles that have been experienced, and are being experienced, are caused by organized minorities who are controlling the great labour organizations of the country. The engineering dispute, which is prevailing at present, has been brought about simply on a vote of 20 p.ct. of the total membership of the unions involved. The experience of most of our members is that, so far as our own individual men are concerned, they are fairly satisfied with their conditions, were generally working well, and, but for the influence of the extremists, would have desired to come to amicable arrangements on the questions involved.

There never was a time when there was greater need for close co-operation between employers and employed than now; and generally, where works are wisely controlled, the best of feeling exists. It is essential now more than ever for the employer to take an intelligent interest in the doings and welfare of his people—to interest himself in their various organizations, sports, ambulance, and other activities that prevail in most industrial undertakings. The officials of the organizations on the side of both the employers and employed need to study more closely the human factor in our industries, which, if wisely directed, would lead naturally to quicker and more complete understanding.

We are doubtless still suffering largely through governmental interference and weak leadership, with an excess of sentimentality, which gave almost complete surrender to the demands of the extremists in the unions during the war period. We have to seek to-day a corrective and the happy mean, with kindly but firm direction of our workers, as no one desires a master more than the workers themselves. They require a master who leads, rather than one who attempts to drive, at such a time as the present. Generally the fault is as much with the manager and foreman as with the heads of industrial undertakings themselves, as frequently the former fail to realize their responsibility to the men who work under them. Too often a manager feels that his work is over when the works close, and he takes but little account of the outside interests of his men when their work is finished.

The keynote of success will be closer co-operation, keener sympathy, and better understanding, with fuller realization of the viewpoint of the other side, which should help to solve many of the difficulties that still lie ahead of industry.

Paper for the Institution of Gas Engineers.—The Society contributed a paper on "Tar Distillation and Sulphate of Ammonia Manufacture" at the annual meeting of the Institution of Gas Engineers in October last. It was read by Alderman F. J. West, to whom and to Mr. Samuel Cutler, Jun., your Council feel the members of the Society are much indebted for the work they did in connection with the compilation.

Ministry of Health and Loans for Extensions.—Reference to this matter was brought up at the last annual meeting in the discussion on the President's Address, when it was thought something should be done to expedite the Ministry of Health in holding inquiries in respect of the application for loans to municipal gas undertakings, as it was felt that if loans were sanctioned quickly there would be much more employment. The Society's case has now been drawn-up and submitted by Sir Arthur Duckham to the Ministry of Health, who have undertaken to review all cases and push them forward as rapidly as possible.

Postal Rates.—Representations have been made to the Government by the Federation of British Industries, Chambers of Commerce, and other bodies, including our Society, urging a reduction in postal rates, to assist industry. It is hoped relief will shortly be granted.

Revision of General Railway Classification of Goods.—The replies of the railway companies to our Committee's counter proposals have been received; and after conference with other traders, meetings were arranged with the railway companies. The discussions thereat were entirely without prejudice, and resulted in offers from the railway companies modifying their original proposals. Meetings of traders to consider these offers have been held, and in some instances the offers have been accepted; but those respecting "Machinery," in which our members are largely interested, have been rejected. Arrangements will therefore have to be made to bring the items in detail before the Rates Advisory Committee, who have been sitting for some time at the Law Courts to determine the matters not mutually agreed between the railway companies and the traders.

Life of Meters Investigation.—The Joint Committee of the Institution of Gas Engineers and the Society on the Life of Gas-Meters have continued their investigations; and the following subjects have been under consideration:

Lubrication of meters by spraying, and the effect of introducing oil vapour into the mains.
The tabulation of new standard sizes, with revised denomination.
Maintenance of automatic meters.
Absorption of hydrocyanic acid.
Internal and external corrosion of mains and services.
Leakage of meter stuffing-boxes.

Standard Gas-Cookers.—The Sub-Committee appointed by the National Gas Council to consider the question of standard gas-cookers have held several meetings, and are approaching the end of their labours. A great deal of useful work has been accomplished, and a report forwarded to the National Gas Council for consideration.

Gas-Valve Flanges.—At the request of one or two members calling attention to the want of a standard gas-valve flange, your Council appointed a small Committee to consider the question. A meeting of this Committee has been held, and considerable correspondence between the members has taken place in the attempt to arrive at a common ground. It is hoped that shortly a provisional standard will be adopted, when it will be submitted to the Institution of Gas Engineers, who, it is hoped, will arrange a Committee to deal with the matter. If the Council can agree on a standard with the Institution of Gas Engineers, it is proposed then to bring it before the National Gas Council and the British Standards Committee, to see if they are willing to adopt it.

"*S.B.G.I.*" *Directory*, 1921.—The Directory was published at the end of November; and it is gratifying to know, as is evident from the letters received from gas engineers and others at home and abroad, that it is so much appreciated. We trust it will prove a valuable work of reference. Our thanks are due to the Committee, of which Sir Arthur Duckham has acted as Chairman, for their services in the matter, and to Mr. G. Hutchins, the Hon. Secretary to the Committee.

Quarterly Bulletin.—The "Quarterly Bulletin" of the Society, which was started at the end of 1920, has been continued; and the Council hope that it has proved useful to the members. It will be of great assistance if the members will communicate matters of interest to the Secretary from time to time, so that they can be recorded, and thus help to make the "Bulletin" of greater value.

City and Guilds of London Institute.—The Society's prizes in connection with the City and Guilds of London Institute Examinations in Gas Engineering, Gas Supply, and Gas Fitting have been awarded, and duly announced in the Technical Press.

The Society wishes to accord its best thanks to the Right Hon. Lord Riddell for his services during his Presidency. On his retirement, he has been pleased to accept the office of a Vice-President; and we hope we may long have the benefit of his counsel and advice.

We also desire to place on record our best thanks to Sir Arthur Duckman, K.C.B., for his able address on "Industrial Problems" at the last annual meeting, which led to a very interesting discussion.

The Trouble in the Engineering Industry.

The Chairman said that, before formally moving the adoption of the report of the Council, he would like to say a word or two

about the present position of the industry—or, at any rate, the engineering industry. Most of the members were connected intimately with the mechanical engineering industry; and it was satisfactory now to know that the report of the Court of Inquiry concerning the engineering trades dispute, which was presided over by Sir William Mackenzie, was a sensible one, a sound one, and one that certainly very largely justified the attitude that the employers had taken up. ["Hear, hear."] Sir William Mackenzie said:

The employers contend that if British engineering is to maintain its appropriate place in the forefront of the industries of the world, there must be freedom to the management to introduce such changes into the works as may be necessary for the proper development of the industry. There are general agreements between the national organizations of the employers and the trade unions settling many of the conditions of employment in the industry, and providing detailed machinery for the discussion of matters arising between employers and employed. It is understood that the employers are willing that the kind of question which has been under discussion during the present dispute should be settled by general national agreement or determined in accordance with procedure set up by such agreements. This is a view to which the unions do not take exception.

Further on, Sir William remarked:

These conclusions doubtless require elaboration, and require to be stated with greater preciseness for the purpose of any final agreement between the parties. In my opinion, however, the matter is one in which no agreement, however carefully devised, can wholly take the place of good sense and goodwill between the parties, and an appreciation by either side of the difficulties and point of view of the other.

He (Alderman Clark) thought they were all in agreement with this. A year ago, when the Society were going to meet, they were facing the coal strike, which deferred the meeting until October. Consequently the year they were dealing with that day had been a very short period; and it was curious that, just as they had arranged this meeting, they should again be in the throes of labour troubles. No doubt this strike or lock-out had been a rather difficult problem. It was a matter that did not altogether appeal to the man in the street; but many people in the large industrial centres in the northern parts of England knew that this interference with management had been a very real thing. So far as some of the smaller works were concerned, where they were more closely in touch with their own people, very little difficulty had existed; and it had been a real regret to both sides that there should have been this stoppage of work. As he had pointed out, Sir William Mackenzie, in his report, had very largely justified the attitude of the employers; but he did warn them, by saying that it was up against each one of them to exercise more forbearance, and to encourage more sympathy and get into closer touch with one another, if industry was to be set upon its right lines. He (the Chairman) was convinced that, if they could get over these troubles and stabilize wages, at any rate for a period, things would very soon get back to a better tone. They would get more work, and so their shops would become busier; and he thought that, if they were careful in their management, they would have peace for a very long time. The present trouble had been brought about simply by 20 p.ct. of the unions voting—20 p.ct. only of the total membership—and perhaps 40 p.ct. of this 20 p.ct. were in favour of continuing work, and something like 60 p.ct. only in favour of this tremendous stoppage. This showed that a great deal of the unrest was brought about by a comparatively few people. Was the whole trade of the country to be upset by a few unreasonable people? He could only hope that when this trouble was over things would settle down for a long while. It would then be up against every one of them as employers to take a greater interest in their own people. There was no doubt that in many works all was being done that could be done to secure sympathy between employers and employees; but in many places this was not the case. A man required justice and firmness; and if he got these, together with kindly sympathy, a better tone would come into their industry than had been experienced for many years past. Sir Arthur Duckham had already suggested to them the need for a Parliament of Industry; and this subject had been recently ventilated in the Press. Probably the time would come when such matters as were now in dispute would be thrashed out and brought to a satisfactory conclusion by some such body as Sir Arthur had in mind.

The Chairman then went on to refer to other matters mentioned in the report. He expressed regret at the illness of Mr. Thomas Glover, and said it would doubtless be the wish of all present that the Secretary should convey to him their sympathy and sincere wishes for a speedy and complete recovery. ["Hear, hear."] This year there was no paper being contributed by the Society to the meeting of the Institution of Gas Engineers, for the simple reason that the year had been short, and had afforded no time to the members to prepare such a paper for the meeting, which was to take place in a few weeks' time. Coming to the "S.B.G.I. Directory," he said that excellent work had been done by the Committee. The Directory was a very valuable work, and reflected great credit upon those responsible for its compilation. There was no doubt at all about its value. Only a few days ago he had had a letter from New Zealand, making inquiries, and saying: "We see in the Directory . . ." Another important thing was the "Quarterly Bulletin," which should prove of real value to the members. It had done exactly what many of them in the past had felt was wanted. Between the meetings, the members had not been in touch with what was being done by the Council; but now the "Bulletin" would enable them to know what was being done. Members must, however, realize that this was their work. The Secretary could not be expected to carry on a thing of this kind unless he was supported by the members, who should send along information and items of interest. They wanted to make the "Bulletin" a real live thing.

Mr. F. J. COCKEY seconded the adoption of the report, which was at once agreed to.

The accounts were also adopted, on the proposition of Mr. CHARLES CLARE, seconded by Alderman F. TEMPLER DEPREE.

NEW MEMBERS OF COUNCIL.

The CHAIRMAN said he had to announce that the following gentlemen had been elected to serve on the Council as representatives of the sections.

J. Wilfrid Drake	To represent Section	I.
T. Alborn Clapham	" " "	II.
C. A. Goodall	" " "	III.
R. B. Hodgson, M.I.Mech.E.	" " "	IV.
A. W. Glover	" " "	V.
Charles Clare	" " "	VI.
J. Bridger	" " "	VII.
E. J. Davison	" " "	VIII.
John Orme	" " "	IX.
T. Allen	" " "	X.
B. B. Waller, A.M.Inst.C.E.	" " "	XI.
Norman Wilton	" " "	XII.

NEW CHAIRMAN AND VICE-CHAIRMAN OF COUNCIL.

The CHAIRMAN next proposed the election of Mr. Albert Clift, J.P., as Chairman of the Council. He said that Mr. Cliff was an ex-Mayor of Stamford; and if he did not make a good Chairman, he ought to. He was a good and hard-working member of the Council.

Mr. H. N. BICKERTON, in seconding, remarked that they would all look forward to Mr. Cliff's year of office.

The resolution having been heartily passed,

Mr. CLIFF said he had to thank the members for the kindness with which they had received his name, and the honour they had done to Section X. in appointing him Chairman of the Council. He promised to devote himself sincerely to doing what he could to raise the credit and forward the interests of the Society. With the cordial support of all, he thought his task would prove an easy one. He had very great pleasure in moving that Mr. Frederick C. Tilley, M.Inst.Mech.E., be appointed to the Vice-Chair. The great advantage of a Society of this kind was that it did seem to connect together widely different individualities. He was sure that Mr. Tilley would shrink from nothing that would help to secure the continued success of the Society. He was glad to think he would enjoy Mr. Tilley's unfailing support, and was quite certain the Society would be the richer for the work that gentleman would do.

Mr. F. J. GOULD seconded the motion, which was cordially passed.

Mr. TILLEY, in acknowledgment, said it was kind of them to confer this honour upon him. He had had the privilege of being on the Council for a good many years, and had not noticed that the duties of Vice-Chairman were at all onerous; but such as they were, he would be only too pleased to perform them.

HONORARY TREASURER AND HONORARY SECRETARY.

Mr. J. W. BROADHEAD, M.Inst.Mech.E., in moving the re-election of Mr. H. M. Thornton, J.P., M.Inst.Mech.E., as Hon. Treasurer, said he was quite satisfied that this proposal would meet with the approval of all the members.

Mr. T. F. C. POTTERTON seconded the motion, which was agreed to.

Mr. THORNTON said this would be the tenth year he had occupied the position. The balance-sheet was a very satisfactory one; and at the present time they were in an even better position than they were at Dec. 31, 1921.

On the proposition of Mr. TILLEY, seconded by Mr. J. WINSON SCOTT, the re-election was agreed to of Mr. F. J. Gould as Hon. Secretary. The mover remarked that Mr. Gould had been for many years a member of the Council, and he would certainly continue to fill his office thoroughly well.

ELECTIVE MEMBERS OF COUNCIL.

Mr. CYRIL G. DAVIS, M.Inst.Mech.E., said it was a pleasure to him to propose the election of Alderman George Clark as an elective member of the Council. Mr. Clark, as they were all aware, had served the Society for many years. He had been a great asset; and during the past year they had had an opportunity of seeing his real value in the position he had occupied. He had made an excellent Chairman, and had shown a clear insight into all things he had undertaken.

Mr. A. W. GLOVER seconded the resolution, which was unanimously passed.

Mr. R. B. HODGSON, M.Inst.Mech.E., then moved the appointment as elective members of the Council of Mr. Samuel Cutler, Jun., Assoc.M.Inst.C.E., Mr. Cyril G. Davis, M.Inst.Mech.E., and Mr. Charles S. Bennett. He said two of them had passed the Chair; and they were all men of ability who had served the Society exceptionally well in the years that had gone by.

Mr. THORNTON, who seconded, said he believed the object of appointing these elective members was that they should not lose

their services on the Council of Past-Chairmen. In this way they could continue to have on the Council the benefit of the sound experience that had been gained by chairmen during their period of office. From this point of view, the plan was a good one.

The motion was heartily agreed to.

Mr. John Orme then moved the election of Mr. R. J. Milbourne, J.P., F.C.S., Assoc.M.Inst.C.E., as an elective member of the Council, and made reference to that gentleman's many sterling qualities.

This was seconded by Mr. Frank West, and at once agreed to.

The Auditors.

On the proposition of Mr. Charles S. Bennett, the re-election was approved of Messrs. Cash, Stone, and Co. as Auditors to the Society.

Votes of Thanks.

Mr. Broadhead said he had great pleasure in moving a vote of thanks to the Council for their services during the past year. He pointed out that what they saw of the Council at the meetings did not indicate in any way the large amount of time and work they put in during the twelve months. The last period of office had not been so long as this; but it had been a very difficult and trying time, and the Council had carried out their duties to the satisfaction of the members.

Alderman Depree seconded the vote, which was accorded with great cordiality.

The Chairman next moved a vote of thanks to the Hon. Treasurer, the Hon. Secretary, and the Secretary for their services during the past year. He remarked that regarding the first two it was not necessary to add anything to what had already been said. As to the Secretary, Mr. Griffith put-in excellent work for the Society. He was always most anxious that it should be run well, and that he should give good service. All that he did year in and year out deserved their best thanks.

Mr. J. W. Scott, seconding, supported the appeal of the Chairman for help from the members in the matter of the "Bulletin." He added that it had been his privilege to serve for some years on the Council; and he knew the good work done in a very unassuming way by Mr. Griffith.

Mr. Arthur L. Griffith briefly acknowledged the vote.

Alderman Clark said he now had pleasure in asking Lord Riddell to take the Chair and deliver his address.

The Right Hon. Lord Riddell, who was received with applause, then proceeded to deliver the following

PRESIDENTIAL ADDRESS.

No subject has excited more attention during the last seventy years than the relation of the State and the local authorities to commercial undertakings—perhaps I should use the proper jargon and say the means of production and distribution. It may safely be said that no subject is of greater importance. Roughly speaking, there are three different schools.

1.—The Spencerians, who contend that the functions of the State should be limited to naval and military protection and the administration of law and order.

2.—The Socialists, who contend that all manufacturing and commercial operations should, in theory at any rate, be carried on by the State.

3.—The "Opportunists," who contend that every instance should be dealt with on its merits. They, however, incline to the theory that all public utility undertakings, such as water, gas, electricity, tramways, &c., should be owned or controlled by the State or local authorities.

THE FUNCTIONS OF THE STATE.

The first-mentioned group is, of course, the exponent of the *laissez-faire* theory. Not only do they object to the State engaging in trade, but they also object to State or municipal interference with trade by means of regulations. It must be admitted that until after the war the influence of the non-interference party had been steadily on the wane. The municipalities had been busy extending their public utility and commercial operations; and Parliament had imposed a mass of regulations upon the industries of the country, intended to secure the health and adequate remuneration of the workers. Disraeli's description of industrial England, in his remarkable novel "Sybil," published in 1845, showed the necessity for State interference. Vast masses of the people were badly housed and badly fed; and the factories, workshops, and mines in which they laboured were for the most part managed solely with the view of making as much profit as possible, irrespective of the workers' health and happiness. The result was a rapid and far-reaching change in public opinion. Every industry became the subject of voluminous legislation by means of statutes, bye-laws, and regulations. In 1911, Parliament in effect fixed a minimum wage for miners, although this proposal almost moved Mr. Asquith to tears. This Act was quickly followed by further enactments of the same class in regard to other trades.

The war was a great socialistic experiment in two ways. First, the nation engaged directly in all sorts of manufacturing and commercial enterprises, and, second, practically every trade and industry in the country was carried on under Government supervision. The effect has been to cause a violent swing of the pendulum. Even socialists have come to see that Government control does not eliminate or remedy the defects of human nature, and that it stimulates and emphasizes a good many of them. The vast extent and complexity of the modern state, and the incapability of Governments to deal satisfactorily and efficiently with matters which can alone be dealt with by Governments, is the real argument against Socialism. The Government machine is overloaded already; and every additional burden increases the delay and circumlocution which seem inseparable from the operations of all Governments and public bodies. On the other hand, it must be recognized that, in this country at any rate, magnificent service has been performed both by the State and the municipalities. Our roads, our drainage system, our water supply, our arrangements for the removal and destruction of house refuse, and our methods for segregating and treating persons suffering from infectious diseases are, or should be, the admiration of the world. Our postal, telegraphic, and telephone systems are also admirable; and, despite all criticism, they compare most favourably with those of any other nation which has to deal with a dense population and highly industrial areas.

VOLUNTARY SERVICE AND INTEGRITY.

There is another objection to Government and municipal trading. It is a common practice to charge men who are serving the public in a voluntary capacity with malevolent motives or incompetence—indeed a thick skin is one of the essentials of public life. This practice does not tend to the successful conduct of commercial enterprises. What joint stock company would succeed under such conditions? Take a typical case. An eminent surveyor and land agent is earning a large income. His ability and integrity are never questioned by his clients or the public. If he has a difficult task to perform, everyone assumes that he is doing his best. The same man enters public life and becomes the head of a municipal department. In this capacity he has to perform similar work to that which he transacted when carrying on his profession; the only difference being that in the one case he is paid and in the other he is not. He at once becomes the subject of attack. His motives and capacity are maligned; and unless he has a thick skin, his life becomes a burden. This tells against efficiency and useful work, and induces a shifty habit of mind. When a man engaged in great affairs spends much of his time in warding off attacks, or when his main purpose is to avoid criticism, his work is certain to suffer. These remarks have no reference to political subjects. I am dealing with the trading or industrial operations of the Government and the municipalities. My point is that no commercial enterprise can be efficiently carried on when the management is continually subjected to acrimonious and often ill-informed criticism.

THE PRIVATE TRADER AND TRADE REVIVAL.

I am not here to-day to discuss economic theories. My only object is to indicate practical difficulties which have led to the change in the public mind which has undoubtedly taken place since the war. We are a nation of shopkeepers. We live on our foreign trade; and whatever theoretical ideas we may hold on the subject of economics, we all see that we cannot hope to exist unless we can revive the goose that lays the golden eggs. We also see that she can only be revived by the private trader. There are two other obstacles to State and municipal trading which must not be overlooked: First, the indisposition of public bodies to pay adequate remuneration to first-class men. The remuneration of the managers of great public enterprises compares most unfavourably with that paid by ordinary commercial undertakings for similar work. It may be said that if State and municipal trading became general, first-class men would be prepared to work for a lower scale of remuneration; but experience does not justify this contention. Human nature still remains what it was; and every member of the community, whatever may be his theoretical ideas, is bent on making as much as he can. This spirit is growing, not diminishing. Each individual wants a substantial share of the amenities of life. There is a growing demand for more comfort and more enjoyment, which all means more money.

The second obstacle is due to the fact that public trading involves the employment by the State or municipality of large bodies of workmen. Rates of pay and conditions of labour thus become political issues. As it is impossible to ensure that everyone should receive exactly the same remuneration, it is obvious that if the State or municipalities were carrying on the whole of the business of the country, and if each class of workers were paid a different rate of remuneration, there would be a continuous dog fight between the different classes as to respective scales of pay and conditions of labour. We all know that Governments and public bodies have no monopoly of wisdom or foresight; and in dealing with trade or commerce they are under special disabilities. The commercial man in private life has a clear objective—the balance-sheet and profit and loss account at the end of the year; and while this may often involve a narrow and selfish point of view, the general effect produces efficiency and enterprise.

NEED FOR PRIVATE BILL LEGISLATION REFORM.

The history of statutory undertakings—such as canals, railways, and electrical work—is very instructive. Parliament has never pursued any set or consistent policy. Canals and railways were constructed upon no general scheme or system; and the statutory electric light companies were organized under a system, or lack of system, which prevented cheap production and adequate development in the interest of the community.

Canals.—The Royal Commission on Canals of 1909 reported

that railways and waterways had been placed in a radically false position by the confused and undecided action of Parliament in the forties and again in the seventies of the nineteenth century, with the result that inadequate use was made of the canals as a cheap mode of transport. A remarkable feature of the canal system is the multiplicity of authorities who control it. A boat travelling from Birmingham to London would pass through canals owned by six different authorities; from Birmingham to Liverpool, seven; and from Birmingham to Hull, nine. In some cases for short journeys of from 25 to 30 miles, five or six different companies have to be reckoned with.

Railways.—Our railway system is one of the best in the world; but this is not due to Parliamentary wisdom or foresight. Railways have been hampered by undue restrictions as to acquisition of land and finance; while, on the other hand, no efficient action has been taken to prevent the watering of capital. The result is that in many instances rates for the carriage of goods, and particularly agricultural produce, are unduly high. Parliament seems never to have grasped the fact that transport is the nation's nervous system. A district can be made or ruined by the railway companies. One trade may be stimulated and another depressed. Charges equivalent to protective duties may be imposed on foreign goods, and the home market may be seriously affected by preferences given to foreign traders.

Electricity.—In reference to electricity, perhaps Parliament cannot be blamed for its failure to appreciate the remarkable future of the electrical industry. Probably no one, except a man like Lord Kelvin, appreciated this in 1888, when the Electric Lighting Act was passed. Only the favoured few, with exceptional scientific knowledge, envisaged at that time the potentialities of electricity, especially for the purposes of power. The Act of 1888 contained provisions for the compulsory acquisition by local authorities of electric lighting undertakings at the end of forty-two years. The price to be paid does not include any allowance for compulsory purchase, goodwill, profits, or other similar items. The crippling effect of such provisions is obvious. It is always difficult to persuade investors to support new inventions; and this difficulty is intensified when the investor knows that the undertaking can be acquired at the end of a comparatively short period without any allowance for goodwill to those who took the risk of founding the undertaking. Another vital mistake was the failure to recognize that cheap power cannot be manufactured by companies working in restricted areas. Recently, but somewhat late in the day, steps have been taken to remedy this.

Telephones.—The history of the telephone system also offers food for reflection. There is no doubt that in the earlier days the action of the Government seriously hindered the progress of the telephone, with the result that even now, when we have an excellent system, we are far behind other countries in the use of this method of communication. In the United States of America, one in eight of the population uses the telephone; in Canada, one in ten; in Denmark, one in fourteen; in Sweden, one in fifteen; and in the United Kingdom, one in forty-seven!

Tramways.—The history of the tramway undertakings is most depressing. The purchase clause in the Tramway Act of 1870 gave the local authority power to acquire the undertaking after the expiration of 21 years. The price to be paid included no allowance for compulsory purchase, goodwill, or future profits. The effect of these provisions upon a new and untried industry can readily be appreciated. No instance of parliamentary interference has occasioned more discussion than the Acts and regulations regarding the use of locomotives on highways. As we all know, the Acts of 1861 and 1865 provided that three persons should be in charge of the locomotive, that one of them should walk not less than 60 yards in front carrying a red flag, and that the speed limit was not to exceed four miles an hour in the country and two miles an hour in any city, town, or village. These provisions continued until 1903, when the Motor Car Act was passed, after considerable parliamentary debate, in which most of the speakers exhibited no appreciation of the forthcoming social and industrial revolution which would be caused by the motor-car. It is only fair to say, however, that the legislators of the sixties were confronted with the possibility of the roads being covered by steam locomotives—obviously a horrible prospect. The trouble was that Parliament did not early enough realize the importance and possibilities of the internal combustion engine.

Gas.—The gas industry is the oldest public utility undertaking in the country. In 1807, one side of Pall Mall was lighted by gas-lamps, and in 1810 the Gas Light and Coke Company received its Royal Charter. The industry does not seem to have suffered from Parliamentary restrictions as severely as most other public utilities, although it is true that standards of illumination and price have been fixed and dividends restricted in certain cases.

When one considers the confused method in which Parliament deals with these great questions, it is surprising that the results are not worse than they are. Most applications for powers are referred to Parliamentary Committees, the members of which may or may not be suitable. Many of them have no expert or business knowledge, and there is a lack of co-ordination between the work of the various committees which prevents the formation of a consistent general policy. Different Private Bills dealing with the same class of subject contain different provisions, and there is no attempt to survey the situation as a whole, and to lay down a general policy. The continual change in the membership of the committees prevents any sense of responsibility for policy. One committee may do one thing, and another another. The names of the members are lost in oblivion. They get neither credit nor discredit for what they do, and in most circumstances it is impossible to say what may be regarded as the policy of Parliament in reference to any particular class of industrial undertakings. The whole system of Private Bill Legislation demands immediate reform. It is unworthy of a great country like ours.

I said in the earlier part of my address that the future of British trade depends upon the energy and enterprise of the private trader. Many people have the habit of making derogatory remarks concerning their own country. I see that Dean Inge, for example, has stated that the Victorian age was the culminating point of our prosperity, and that the Elizabethan and the Victorian ages will appear to the historians of the future as the twin peaks in which English civilization culminated. I have no belief in prophets—they are almost always wrong; but I do believe in the ability of my fellow countrymen. Whatever may be the defects of the present day, the mass of the people enjoy a greater measure of comfort than they did in the Victorian era, and instead of exhibiting symptoms of decay, as is alleged, British commerce and British industries are displaying increased signs of activity in all directions. To form accurate judgments about the state of the country, you must mingle among the people who are doing things, and not peep out at the world through the window of a cloister. The activities of our people are so vast and varied that no generalization is of any value unless based on accurate knowledge of what is happening in the different sections.

It can easily be proved that our country stands in the first rank in almost every branch of human thought and action. At your last year's dinner I was much interested by the account of British achievement in the gas industry. In the past, British inventors, and those engaged in the commercial side of the industry, have always been to the front. They are to the front to-day. The industry was never more enterprising and never more resourceful than it is at the present time. New and improved methods are being eagerly adopted, and every effort is being made to extend and develop this important branch of industrial commerce. What applies to the gas industry applies to other industries. In short, we are not suffering from any lack of ability or energy on the part of our commercial and trading classes. Our troubles are mainly due to the conditions prevailing in other countries. If the British manufacturing and commercial classes have a free hand; if capital and labour pull together; if each class recognizes that one cannot get more out of an industry than there is in it, I have no fear for the future of British commerce.

THE PRESIDENT THANKED.

Alderman CLARK said he had consulted Lord Riddell, who stated that he would welcome any remarks the members might care to make upon his address.

Sir ARTHUR DUCKHAM, K.C.B., M.Inst.C.E., said it was a great pleasure to him to propose a vote of thanks to Lord Riddell for his address and for his services to the Society, because they must all of them realize what a sacrifice he had made to be their President and to come and give them such an excellent address. Some of the members thought they were busy men, but none could compare in any way with the extraordinary calls which were made upon Lord Riddell's time and energy. This time and energy had been devoted, throughout the war and since the war, to the benefit of the country. They had all derived tremendous advantage from his services; and when they reflected upon the fact that he had given up the necessary time to the preparation and delivery of such an address, they must feel very grateful to him. Listening to the address, one could see the very shrewd working of Lord Riddell's mind. Very much that he had told them they would appreciate distinctly; and he (Sir Arthur) thought it was up to them to use whatever endeavour they could to try to improve the position of this whole question of public utilities—because, of course, they were all of them public utility men, as far as this country was concerned. In connection with their local bodies and parliamentary elections, he thought the words Lord Riddell had given them would help them very much in the future. The address was almost beyond description, and almost beyond commendation; but they did appreciate all that their President had done for them.

Sir HENRY FOWLER, in seconding the vote, said that, speaking as an outsider, he thoroughly appreciated the opportunity of listening to the address. Whenever one had the chance of hearing Lord Riddell, one might be certain of deriving some benefit. The heartening effect his address must have upon them was its greatest point—particularly to those of them who took part in public work. The President was absolutely correct when he said that one got commended by one's employers, so long as these employers were not ratepayers in the town in which one lived. This, as Lord Riddell had pointed out, ought not to be; and it lay upon them to do what they could to encourage, rather than discourage, those who were willing to undertake duties for the public benefit, and which so many had taken up in so successful a manner.

Alderman DEPREE said he would like to express gratitude to the President on his own behalf—and he was sure that in doing so he would be voicing the opinion of all who had had the pleasure of listening to the address. He did not think any of them had ever before had such a magnificent description of their duties in connection with the industry as they had listened to that day. One point that was very frequently lost sight of by the general public was the action of the gas industry at the time of the war. One of the most distinguished statesmen of the day, Lord Moulton (who occupied the same position as Lord Riddell now did in connection with the Society), drew special attention to the great indebtedness of the

country to the gas industry during the time of the war. When they were being criticized—as they were criticized—with reference to what they supplied to the public, some little credit might be given to the industry as a whole for the enormous sacrifices made, not only by individuals, but by companies, in connection with the work that they did at that time. The President had laid stress upon a point which appealed to him (the speaker)—namely, that men who went into public work generally got "more kicks than halfpence." This had unfortunately been the experience of most of them. It had been a great pleasure to listen to the address; and he most heartily supported the vote of thanks.

Alderman CLARK also supported the vote, because he felt they owed a great debt of gratitude to Lord Riddell for acting as their President. Seeing that he was so actively engaged in both public and private life, they must feel very grateful to him for giving up so much of his time to their Society. Lord Riddell was one of the few remarkable men in this country.

The vote having been carried by acclamation,

The PRESIDENT, in returning thanks, said he regarded it as a great honour to be elected President of the Society. Lord Moulton was one of the most distinguished men that this country had produced for many years; and during the war he did remarkable work—work which could not have been done, perhaps, by any other man. Mr. Balfour Browne, another President, was also a remarkable man. Instead, therefore, of the members paying him (the speaker) compliments for coming there and acting as their President, he thought "the boot was on the other leg;" and he was much obliged to them for giving him the opportunity. His services had been very slight. The preparation of this address was practically all he had done; and he wished he had had the opportunity of doing more. The topics dealt with in his address, as they knew, really touched the heart and soul, not only of their business, but of all businesses, and of the conduct of public life. It was becoming increasingly difficult to induce men to enter public life. One of the best features of this country had been the devotion of private individuals to public service. Long might it remain so! Nothing hurt him more, and nothing, he thought, was more derogatory to the country, or more harmful to it, than constant attacks upon British mental and physical qualifications. He had been to other countries; but he had never found people more efficient than his countrymen. The Americans were very kind and hospitable; but they were not more efficient than the people of this country. There was not a greater nation in the world than the British; and there was no reason why they should always be running themselves down. There was no reason why they should be boastful; but, on the other hand, they certainly should not make derogatory statements about themselves. Let them take any industry—no matter what. Perhaps at one time they only knew it by name; and then for some reason they found it necessary to enter into closer connection with it. Directly they got within the charmed circle, they met numbers of clever men who had devoted the whole of their own lives to the study of the problems of this particular industry, and were astonished at all there was to be learned, and to find that these things had been going on in the world without outsiders knowing what was taking place. Suppose he entered the gas industry, he would no doubt find it was a most complicated affair; that there were all sorts of things to be learned about it; and that there were books upon books to be read and all manner of questions to be considered—in fact, enough to interest one for the whole of one's life. That was only one industry. He did know enough of the gas industry—having been their President—to realize that the people in this country engaged in that industry knew as much about gas as, if not more than, the men engaged in the same industry in any other country; and if they took other industries and examined them in the same way, they would find that if Great Britain did not stand at the top, it was at any rate not far behind.

LORD RIDDELL AGAIN PRESIDENT.

Before the members adjourned to tea, Alderman Clark announced, amid loud applause, that Lord Riddell had consented to be their President for another year.

VICE-PRESIDENTS.

The following is the list of Vice-Presidents of the Society:

Sir Dugald Clerk, K.B.E., F.R.S.
Charles Clare.
Prof. Arthur Smithells, C.M.G., F.R.S.
Prof. Harold B. Dixon, C.B.E., Ph.D., F.R.S.
Surgeon-General Sir Alfred Keogh, G.C.B., C.H., G.C.V.O.
The Right Hon. Sir Henry E. Duke.
Sir Robert A. Hadfield, Bart., F.R.S.
Sir Arthur Duckham, K.C.B., M.Inst.C.E.

THE DINNER AND SOME TOASTS.

In the evening the members and a number of guests had dinner together, with the PRESIDENT (the Rt. Hon. Lord Riddell) in the chair. On the right-hand side of the President were Alderman George Clark, J.P. (the Chairman of the Council), Sir Henry Fowler, K.B.E., Mr. Jacques Abady, Mr. Albert Cliff, J.P. (the Vice-Chairman), Mr. W. E. Price (the Hon. Secretary of the Institution of Gas Engineers), Mr. F. P. Tarratt, Mr. F. W. Goodenough, and Mr. H. M. Thornton. To the left-hand side of the President were Sir Lawrence Weaver, Sir Arthur Duckham, Mr. Thomas Hardie (the President of the Institution of Gas Engineers), Sir G. E. Davies (President of the British Commercial Gas Association), Mr. Charles Clare, and Mr. H. G. Ruggles (President of the Eastern Counties Gas Managers' Association). The central organizations were also represented by Mr. E. J. Fottrell, Mr. Sholto S. Ogilvie, and Mr. W. J. Smith (of the National Gas Council). Mr. W. T. Dunn, the Secretary of the Institution of Gas Engineers, was there. The British Commercial Gas Association, in addition to the Chairman of the Central Executive Council, was represented by Mr. W. M. Mason and Mr. J. C. Walker. Mr. Arthur L. Griffith, Secretary of the Society of British Gas Industries, was indefatigable in looking after the comfort of the guests. After dinner, a number of toasts were honoured, and intermingled with the speeches was an excellent programme of music under the direction of Miss Millicent Russell. The accompanist was Miss Winifred Gardiner; and the other artistes were Miss Doris Tomkins, Mr. Stuart Robertson, Mr. Bret Hayden, and Mr. John Perridge.

Loyally the members drank to the toast of "The King," submitted by Lord RIDDELL.

FAMOUS PAST PRESIDENTS.

Sir HENRY FOWLER proposed the toast of "The Society of British Gas Industries." In the course of his remarks, he said that he remembered the happy years when he was a gas engineer. He believed that he still had on the Midland Railway under his control a larger number of incandescent gas-burners than any other individual in the world. He was proud of the fact that the first incandescent gas-burner on the Midland Railway was put in at his own instigation. He was glad to be present on this occasion, and to be with his old friend, Alderman George Clark, because he was proud of the fact that the position he (Sir Henry) now occupied was once held by someone who had Mr. Clark as his subordinate. He was delighted to remember that the gentleman who was now the honoured Chairman of the Council of the Society was once in the employ of the Midland Railway Company. But turning to the toast itself, as Director of Production to the Ministry of Munitions during the war, he appreciated very much how the members of the Society, and the gas industry generally, assisted them by good and patriotic work—the members of the Society particularly on the engineering side. The Society had good reason to be proud of the part they took in making up the deficiency that there was with regard to the production of shells, from which shortage the country were suffering at one period of the war. Apart from this, as Chief Mechanical Engineer of a large railway, he also appreciated the value of the work that the Society had accomplished during the past fifteen or sixteen years. It was, at one time, the fashion to speak of the gas industry as a dying one; but it was not by any means so to-day. Where was there an industry that had done the work that had been accomplished by the gas industry during the last fifteen or sixteen years? At the present day, the industry was more flourishing than it had ever been since Murdoch started the ball rolling by lighting-up the Soho works. Now both in the home and in the works, the people of this country were very largely dependent upon the great industry which the Society represented. In the Society's book of rules and list of members, there was a page giving a list of the Past-Presidents; and he saw that all of them were illustrious men. He had had the good fortune personally to know the majority of them; and they were all men who were not only distinguished for their great attainments, but who consistently showed the greatest courtesy to everyone with whom they came in contact. They had always been willing to help those who were lower down in the scale than themselves. He remembered the kind words that had been spoken to him by Sir George Livesey. Sir Dugald Clerk, too, was always willing to help; and the same thing could be said with regard to Lord Moulton. As to Sir Arthur Duckham, he could only say that from him he received the greatest courtesy and kindness when Sir Arthur was his senior in point of office, if not in years, in the Ministry of Munitions; and he knew from his work during the war that Sir Arthur possessed to a very considerable degree those qualities which he (Sir Henry) knew had distinguished his predecessors in the presidency of the Society. Then those who had heard the wonderful address delivered by Lord Riddell that day would appreciate what a good President the Society had now. He expressed the hope that the distinction that the Society had gained during its career through its good work would continue year by year to the benefit not only of the gas industry, but of the community at large. He coupled with the toast the name of the President.

Lord RIDDELL said the members had heard him speak at some considerable length that afternoon; and therefore he imagined they would not desire to have very much more of him that evening. But he wished to thank Sir Henry Fowler for the very graceful things he had said of the Society, and of those associated with it. He was especially glad that Sir Henry had referred to the record of the gas industry during the war. As all present well knew, the industry then played a most important part, although very little had been publicly said as to what it actually did. He believed that, the manufacture of gas being the basis of the production of a great many explosives, the services rendered by the gas industry were absolutely essential for the conduct of the war. Sir Henry had mentioned the name of one gentleman who had been prominent in this respect. He (the President) believed that it was during last year he met another distinguished man (Dr. Carpenter), who was a great authority on gas, and who during the war, in common with other members of their craft, rendered most valuable services. He had been particularly interested in meeting Sir Henry Fowler there that night, because of the distinguished place that he held in the Ministry of Munitions during the war. He thanked Sir Henry for what he had said about himself; for he (Lord Riddell) regarded it as a great honour to be the President of this Society. To follow in the train of such Presidents as had preceded him was indeed an honour which no man could fail to appreciate. There was Sir Dugald Clerk, a great scientific man, and one of the foremost mechanical engineers of the day. There was Sir George Livesey, who in his time was not only a great gas engineer, but a great social reformer. There was Mr. Balfour Browne, who was a most remarkable person; and Sir Alfred Keogh, who saved millions of lives by his great organizing powers during the war. There was Sir Henry Duke, one of our foremost Judges; and Lord Moulton, who was one of the greatest men produced by this country for many years. He did remarkable work during the war, which work, however, was not appreciated by the general public as it should have been, because the general public did not understand what eminent services he actually rendered. The President proceeded to review the objects of the Society, and then said he wished to thank the Chairman of their Council (Alderman Clark) for the most interesting conversation he had

had with him during the dinner. He had told him of many of the wonderful men who had been associated with the gas industry. He (Lord Riddell) did not think that people knew enough about what such great men had done. They were men who had accomplished much good in the world; and as he listened to what their Chairman told him, he said to himself: "I am proud to be an Englishman." [Applause.]

THE PRESIDENCY POLICY.

Alderman CLARK said he had to submit the toast of "The Vice-Presidents of the Society," coupling with it the name of their senior Vice-President (Mr. Charles Clare)—a gentleman who had been associated with the Society since its institution. As Lord Riddell said, they had an important and interesting list of Past-Presidents, many of whom now came into the list of Vice-Presidents. They were men who stood out in science, in engineering, in law, and in other walks of life—men who had made their names, and had added lustre to their Society by being their President. The members of the Society—and probably it was common to most Englishmen—were gregarious people. They liked to work in droves. As gas engineers, they were out in a body, and they wanted to do good for the great industry with which they were individually, and as a Society collectively, identified. The Society was formed so that they could pool their knowledge and experience; and in this way they did good for themselves, as well as for the people with whom they desired to do business. In this work their Vice-Presidents had rendered them great help, and therefore he asked all present to drink to the health of the Vice-Presidents, coupling with the toast the name of Mr. Charles Clare.

Mr. CLARE said that, in replying for the Vice-Presidents, he was doing so for the Past-Presidents with one exception, and that exception was himself. The reason that he was a Vice-President was that, in helping to form and establish their Society, he was their first Chairman for four consecutive years. Of course, during that period there was a great deal of spade work to be done, and a good deal of indifference to overcome, as well as certain suspicions to be allayed. In consideration for any services he had been able to render the members of the Society, they had presented him with a handsome tea service; and they did him the further honour of appointing him one of the Vice-Presidents. One of the first and greatest difficulties of the founders of the Society was the question of the presidency; and it was their view that, instead of keeping the presidency in a sort of rut, it would be a better plan to seek their Presidents among men of light and leading, who could give them instruction upon the questions of the day in which they had a direct or indirect interest, and from which they could derive some direct or indirect benefit. When they looked down their list of Presidents, they saw there the names of eminent men who had passed away: Sir George Livesey, Sir Corbet Woodall, Mr. Balfour Browne, and Lord Moulton, and equally eminent men who were happily still with them. He thought they could say that there was no society that had a more distinguished list of Presidents than had the Society of British Gas Industries; and if they considered those admirable presidential addresses that they had had year by year, he was sure the members would all agree that the policy of the founders of the Society in respect of the Presidents had been fully justified. On behalf of the Vice-Presidents, he thanked all present for the manner in which the toast had been honoured.

FEDERATION OR CONTINUED SEPARATION.

Sir ARTHUR DUCKHAM proposed "Kindred Associations." In the course of his remarks, he said that, as the members well knew, he desired something stronger than "kindred" associations. He wished that the toast had been "federated" or "associated" institutions, or some other name. He had spoken in season and out of season of the linking-up of the various associations or institutions connected with the gas industry; and he thought that the movement with this object in view had come largely from their own side, while sympathy had been expressed from the other side. Before they could hope for such association, they as a Society had certainly to show that they were quite worthy of it. What he felt was that they must show themselves more worthy than had been the case that afternoon by the comparative smallness of the attendance at their meeting. The attendance that day was not good enough to justify them in having a President like Lord Riddell. He said publicly, in order to enforce it more strongly, that if their Society was going to be what it should be, and to deserve Presidents like Lord Riddell, and his friend Lord Weir (who had promised to serve as President the year after), they ought to turn-up in greater numbers, and show that they were worthy of being the colleagues of the other associations, the members of which turned-up in their hundreds as against their own tens.* He had to couple with the toast the names of Mr. Thomas Hardie and Sir George E. Davies. Regarding Mr. Hardie, they congratulated him not only upon being President of the Institution of Gas Engineers, but upon having reached the premier position among gas engineers in this country—the position of Chief Engineer to the Gas Light and Coke Company. He was a man who was most suitable to fit and to fill that high position; and they, as contractors, were well aware that from Mr. Hardie they would always obtain fairness and justice in the work which they did with, and for, him. They congratulated him, and they congratulated his Company, upon having made such a wise appointment. As to Sir George Davies, they had only to go to Bristol, when they would at once hear of what their friend had done for that city. He was the President of the British Commercial Gas Association, with which body they, as a Society, had something to do. Their connection with it would be a benefit to themselves as well as to the gas industry generally; and this benefit would be increased by having a man at the head of the "B.C.G.A." with such driving force and power as Sir George Davies.

Mr. THOMAS HARDIE thanked those present on behalf of the Institution of Gas Engineers for the manner in which they had received the toast of "Kindred Associations." He also desired to thank Sir Arthur Duckham for the kind remarks he had made regarding himself. He was sure the Institution of Gas Engineers was very pleased indeed to feel that they had kindred association with the Society, and particularly so was he, as the President of the Institution, after hearing the very long list of objects of the Society that had been read out by their President. He could not say the objects of the Institution were any better. He did not think it possible they could be; but they had a large number of objects, and to some extent they might, and did, differ a little from those of the Society. They had no doubt a great deal in common. It was common to both that the members of the Society and of the Institution relied upon the demand for gas for keeping them going; and he thought that both should endeavour to do their share in this respect. Of course, the demand for gas depended upon what was supplied; and it was for the members of the Institution to supply the gas, and to a large extent it was for the members of the Society to supply the apparatus by which it was burned. Both gas and appliances must be satisfactory, or else he was afraid their business would fall away. Of course, at the present time, the makers of apparatus might think they were in rather a difficult position, owing to the changes that had been made. There was, for instance, a great variety of ideas as to the quality of gas to be supplied; and this, he expected, had led some of the members who were makers of gas-consuming appliances to wonder what should be the quality and character of the appliances they should supply. However, both were working together. They were doing their best. It had been suggested that night, or rather he thought Sir Arthur Duckham mentioned it to him, that gas engineers might do something more in the way of getting more business going at the present time. But he (Mr. Hardie) thought this was scarcely necessary in view of the fact that so many of the members of the Society seemed to be under some difficulties at the moment with regard to labour. For this he was very sorry indeed. They had had published that day Sir William Mackenzie's report on the inquiry he had made into the causes of the dispute in the engineering industry; and he was very hopeful that something would arise from it. Sir William said that no agreement, no matter how carefully devised, could take the place of goodwill and of good sense, and that each side must appreciate the difficulties from the point of view of the other. It was up to the members of the Society, as employers, to read into that as much as they expected the other side to read into it. This applied to other questions than that of capital and labour. It also applied perhaps to the connections between the Society of British Gas Industries and the Institution of Gas Engineers, as well as to their business relations with each other. If they looked at what was intended, and in good sense, they could get things carried through as they wished them to be. Sir Arthur had referred to a suggestion he made some months ago, when he proposed a reorganization of the several societies interested in gas. At the time the suggestion was published, it did not seem to receive a great deal of attention. He (Mr. Hardie), however, could assure Sir Arthur that it had more attention bestowed upon it than at the time he possibly thought it had. He himself read through the scheme with very great interest; but he must say he did not agree with it. After all was said and done, the body that Sir Arthur proposed would have been an unwieldy, and he thought an unnecessary, one. Each organization had its own particular interests; and it was perfectly easy, when occasion required, to come together and discuss matters of mutual concern. In his opinion, they could discuss these matters, and come to conclusions better than if they sat together as one body. He was glad to be present on behalf of the Institution; and in the name of the members of that body he thanked those present for the manner in which the toast had been received.

GAS ORGANIZATIONS AND PROGRESS.

Sir GEORGE DAVIES (President of the "B.C.G.A.") also responded. In doing so, he said that thoughts naturally turned to the extent to which all of these different bodies connected with the gas industry had contributed their part to building-up the present prosperous condition in which the industry found itself. He supposed it was a little difficult in these days, when gas was used for so many purposes, to remember that, until comparatively recent times, almost the only use of gas was as an illuminant. The early gas engineers only devoted their attention to using gas as a lighting agent; and he supposed if their forefathers had charge of the industry in these days, they themselves could look forward to the time when electricity would supplant gas as an illuminant to the extent it had done in recent years, and then they could certainly regard it as a dying industry. Anyway, the industry could not look for any large measure of support and success in such circumstances. Those connected with the industry at the present day knew that this was not the condition in which it found itself; for each concern had greatly increased, and was still increasing, its output of gas, and the various uses to which it was being applied were increasingly appreciated by their customers. It seemed to him that the work of these various societies was something to which they might distinctly point as a great advantage, inasmuch as it was largely through them the public were using gas to an increasing extent, and were realizing too that, to whatever degree electricity might replace it as an illuminant, gas had a great future in the larger developments for heating and cooking, and for the various industrial purposes to which it was applied in modern times. Therefore, all the institutions connected with the gas industry might take to themselves some credit for the favourable condition in which the industry found itself—a state of things never contemplated by those who originally established it. They should probably recognize first the good work done by the National Gas Council; and no one connected with the gas industry could fail to recognize the able and generous manner in which Mr. Milne Watson had carried out the duties of the office of President of the Council in recent years. On the technical side, gas engineers had been constantly experimenting and discussing the latest developments which technical science would allow to be brought to bear upon the manufacture of gas, and also to increase the efficiency of the plant and the apparatus which had brought, to a large extent, the greater success to the industry. This Society had borne a very important part in constantly increasing the efficiency of their productions, and in so doing it was hoped they had had a fair return for their work. He thought he might also claim that the Association of which he had for the time being the honour

* The Secretary informs us that he had received a large number of letters of apology for non-attendance on this occasion—many abstentions being due to the difficulties of the moment in the engineering industry.

of being President—that was, the "B.C.G.A."—had done a valuable part in popularizing the use of gas, and in bringing home to the masses of the people, whom they wanted to turn into customers, how well gas could serve them. This had been done under the able chairmanship of their friend, Mr. Goodenough. It was very largely through his instrumentality that knowledge had been distributed through the country as to the manifold uses of gas. He ventured to think, therefore, that they might admit and recognize (as had indeed been so generously done) that the working together of these bodies had had a great part in bringing about the present satisfactory condition of things. He hoped that the same good feeling and the same hearty co-operation would continue, even if they were not to be brought together in one great Association, as Sir Arthur Duckham had suggested. Each of these Associations had its part to play in the interests of the industry in which they were all concerned; and he hoped that the same good work might go on for the benefit of the whole industry.

Optimism as to the Future.

Mr. Albert Cliff, J.P., proposed the toast of "The Visitors." In doing so, he said that Sir Arthur Duckham complained about the attendance of members at their meeting that day; but surely the members of the Society were at present going through very difficult and strenuous times. There was no doubt that many of them were working in circumstances and experiences at their works that were calculated to depress the most buoyant spirits. At the same time he undoubtedly believed that it did a great deal of good to get together, and to arm themselves by an exchange of ideas. He thought, in fact, they were called upon as loyal British subjects to keep well to the work of stimulating and helping each other in these anxious times. He had noticed that there had been a great absence of reference to the trades in which the members were engaged. He felt very sincerely that the trades represented by the Society were bound to go forward smartly before very long. Regarding the toast, the members of the Society heartily welcomed their visitors that day. With the toast he had to connect the name of Mr. Jacques Abady, who was himself an inventor of gas appliances—he started in gas, but had turned to the law. He had also to associate with the toast the name of Sir Lawrence Weaver.

Owing to the lateness of the hour, only brief responses were made by both Mr. Jacques Abady and Sir Lawrence Weaver; but though their remarks were much abbreviated, they were none the less hearty on that account.

THE CORROSION OF GAS-METERS.

[Communicated.]

The subject of the heading to this article has such a direct interest for those engaged in the gas and allied trades that any information as to the causes of corrosion in gas-meters should be of practical utility.

As is well-known, the question of the corrosion of dry meters has engaged the attention of the trade for some considerable time, but the composition of coal gas is of so complex a nature that the chances of deterioration are very great. Nevertheless, some light may be thrown upon the question of the corrosion of the metallic portions of meters. An interesting communication upon this subject was made some time ago by Sohren; and though he concluded that the question was not then ripe for discussion, yet his study of the subject served a useful purpose, and Stommel's researches have since borne out the former's observations.

In the first place, it is necessary to ascertain the causes of the flaws and gashes in the thin coatings ("membranes") and then to determine to what causes are to be attributed putrefaction of these coatings, their faulty conditions, and the disappearance of the matter by which they had become impregnated, and, finally, the corrosion of the metallic parts.

With the assistance of no less an authority than M. de Roehl, Stommel commenced his labours by ascertaining what acids were contained in washed benzoles; and while no sulphuric acid was discovered, some organic volatile acids were found. In order to decide as to these acids, 25 c.cm of benzole was mixed with an equal quantity of previously neutralized alcohol, an alcohol solution of phenol and naphtha (phenolphthaline) was added with a 10 p.ct. normal alkaline solution, preserving the red tint, and then titrated; 1 c.cm. of *n*/10 alkaline solution corresponding to about 0·4 degree of acidity. The result can also be calculated in acetic acid, 1 c.cm. of *n*/10 alkaline solution corresponding to 25 c.cm at 0·024 p.ct. of acetic acid. The analysis gave about 24 thousandths p.ct. of acetic acid. The question has, therefore, been settled that such small quantities do not play any part in practice. It is the same when air is added to gas, when the quantity added does not exceed 2 p.ct.

Solidification of the cocks of lanterns is but rarely produced, and is to be attributed to mechanical defects, and not to have arisen from oxidation. When cold causes metals to contract, the spirit takes up the dust on the cocks between the surfaces of friction, and impedes proper working. It should not, however, be inferred that spirit or alcohol tends towards the corrosion of gas-meters, for had that been the case there would undoubtedly have been complaints during the many years that spirit-vapours were used generally to prevent the congealing of lanterns. Nor is it correct to condemn the scouring effect of the hydrocarbide vapours contained in all coal gas in the proportion of 6 to 10 p.ct. unless some foreign matter or vapour should have been added thereto. This is even the basis of autocarburization, and it is here worthy of observation that, according to Sohren, the Bonn gas-works carburized with benzole for a considerable period without a single case of the corrosion of dry meters having occurred.

But the reverse is the case when unwashed hydrocarbides are vaporized in the gas-pipe. This raw material contains as much as 2½ p.ct. of residues, which, profiting by the warm temperature, become condensed and cover the inside of the meter with a gelatinous coat, which may, in certain circumstances, become thoroughly hardened. The natural result is that the elasticity and freedom of movement of the interior are affected, the meter going out of order. If these residues do not become condensed into a gelatinous matter they remain unchanged, though, in a dry meter, once having entered it, they become resinous or rancid and form fatty acids, which in time cause the linings to decompose.

With washed benzole, such phenomena cannot be brought about as a natural result. The washing of the benzole and the other hydrocarbides prevents, to some extent, the formation of fatty acids, because it takes from the hydrocarbides those oily or tarry compounds which, by becoming rancid, form the basis of fatty-acid formation. A washed hydrocarbide remains as clear as water; the raw material, on being exposed to the light of the sun, becomes yellower and darker, according to the progress made in the process of acid formation.

But though fatty acids may attack and destroy the inner coatings of gas-meters, they do not bring about deterioration in the metallic portions of them, so that another cause must be found for this defect. As to this, it is interesting to observe that a chemical products works at Bruchsall supplied some anti-naphthaline to a large gas-works in the south of Germany, as a result of which complaints were received as to the obstruction of the vaporizing pipe. Upon investigation, it was found that the vaporizer was made of copper, while the remainder corresponded with the well-known Rauch system. In spite of the assertion that the pipe had been cleaned only eight days previously, it was nevertheless opened, when it was found that the obstruction was caused by products of oxidation and residues, which appreciably reduced its diameter. A portion of these oxidization products was removed and analyzed, when it was at once perceived, from the penetrating mercaptan odour, that the trouble did not arise from the anti-naphthaline which had come from the chemical works, but from a hydrocarbide issuing from the compression of oil gases. The manager of the factory in question finally was convinced as to this, and produced two barrels which had come from a different source. It was maintained, however, that even the unrefined hydrocarbide could not, in a comparatively short time, completely deteriorate the vaporizer. After further investigation as to the factor which exercised so injurious an action upon copper, acetylene at once suggested itself. This presumption received support from the fact that fatty gas-works of the State railways mix acetylene with oil gas, to which a quarter of acetylene gas is added, and submit the mixture to 12 to 15 atmospheres pressure.

In this operation the mixture of compressed gas gives a liquid hydrocarbide as waste, this forming the crude product of the hydrocarbides in question. It is a long time since acetylene (in the proportion of a quarter) was first added to oil gas; the hydrocarbides resulting from the pressure of this mixture—which are employed by gas-works in carburization—containing acetylene which deteriorates gas-meters. As may be generally known by those in the trade, formerly, when oil gas alone was compressed, this state of things did not exist. Gas-works would, therefore, be well advised to discontinue the employment of these dangerous hydrocarbides, in spite of the low price at which they may be offered under various names—such, for example, as anti-naphthaline, benzole, hydrocarbide, carbide, gasine, &c.

An analysis of the oxidation products in question extracted from the obstructed tube of the vaporizer showed that they contained copper, iron, and principally resinous bodies, the residues containing large quantities of mercaptan. To sum-up, therefore, the hydrocarbides resulting from the pressing of fatty gases and which contain mixtures of acetylene are not suitable to be vaporized with coal gas because—

(1) Acetylene, mercaptan, and the resinous fatty acids attack and quickly destroy the metal of gas-meters.
(2) All the residues of unwashed hydrocarbides contain tarry and oily ingredients, which, independently of the fatty acids, condense into gelatinous layers when they get warm in the meters, and consequently are likely to bring about complications.

Yorkshire Junior Gas Association.—Next Saturday afternoon, by invitation of Mr. Frank H. Robinson (the Engineer and Manager), members of the Association are to visit the works of the Harrogate Gas Company. They will assemble at the works, which are on the Ripon Road, at 3 o'clock.

Reprints of "Figures and Facts" Articles.—Since the announcement appeared in the last issue of the "Gas Salesman" as to the reprinting of these articles from the February and March issues of the supplement, fresh arrangements have been entered into for the printing, which enable us to make a considerable reduction in the price. The pamphlets are in octavo form; and prices (post free) are as follows: 100 copies, £1; 50 copies, 10s. 6d.; 25 copies, 5s. 6d.; single copies, 3d. Orders should be addressed to Messrs. Walter King, Ltd., No. 11, Bolt Court, Fleet Street, E.C. 4.

VICKERS GAS-METERS.

Ordinary and Prepayment Types.

Meters of both the ordinary and prepayment type, of which the following is a description, are now being manufactured in Size No. 2 by Messrs. Vickers, Limited, of Vickers House, Broadway, Westminster, S.W., and Erith. A feature of the prepayment meter is that the mechanism is sturdy and fool-proof against reasonable hard usage; and in addition it is handy, accessible, and secure both to the consumers and the officials of the gas undertaking.

THE ORDINARY TYPE.

[See Figs. 1 and 2.]

The A/C, or ordinary type, meter consists essentially of two parts: The outer casing, comprising the inlet tube and the index, with its housing (referred to as the casing); and the inner group, comprising the measuring chambers, valve platform, valves, and operating mechanism (referred to as the mechanism). When the two groups are assembled together, the casing stands clear of the mechanism all round, giving, in addition, generous clearance round the valve platform. In effect, the mechanism is slung in the casing and touches only at three points for support. This

Fig. 1.—Ordinary Type, Size No. 2.—View of the External Casing.

The loose pieces represent the bottom, the cap, the two half-collars sealing the outlet tube, and the ring for the wax seal.

provision is a valuable one, because it tolerates a measure of accidental injury to the casing without corresponding injury to the mechanism, and without affecting the functions or efficiency of the meter. There are no partitions in the casing involving gas-tight compartments. The whole of the space between the casing and the mechanism is occupied by an atmosphere of unmeasured gas. This forms a small reservoir seeking admission to the inlet valves, and thence to the measuring chambers and outlet tube.

THE CASING.

The casing is rectangular in form, and is suitably panelled to give structural stiffness. The over-all dimensions are approximately: Height of casing to top cap, 13¾ in.; height of meter over the couplings (top member), 16¼ in.; width of casing, 8¾ in.; depth of casing, 6¾ in.; and depth of casing over index, 7½ in. The bore of the inlet and outlet pipes is ¾ in., as in the standard 5-lt. meter. The chamber capacity is 0·166 c.ft., and the nominal rating is 40 c.ft. per hour.

THE MECHANISM.

Measuring Chambers.—These consist of two pairs of dished vessels, or four units in all. Each unit is pressed and flanged under a power press. The vessels are rectangular in shape, with large rounded corners and bevelled sides to permit the sheet metal to flow easily in the dies. The flanges of each pair of units are corrugated in the form of an endless band all round the rim. The corrugation of one unit is a groove, and that of the other a bead; and by means of these a pair of units are accurately located and rested flange to flange. A pair of units is secured by eight brass screws.

Diaphragm.—There are two per meter. Each comprises three simple parts—two metal discs and one leather membrane for each measuring chamber.

Discs.—The discs are two rectangular metal plates, flanged and corrugated to give stiffness. One of the discs is provided with a socket bearing for connecting to one of the arms actuating a flag-rod. The two discs are mounted on the middle of the membrane, one on each side, and are secured by two small bolts passing right through.

Membrane.—This is of Persian sheep skin specially dressed, and is without seams. The membrane is mounted between the flanges of a pair of vessels and gripped between the corrugated bead and groove, and secured by means of eight small brass screws. There is no soldering at or near the joint; and the membrane can be removed and replaced in a few minutes. This operation can be repeated an indefinite number of times without affecting the functioning or efficiency of the meter.

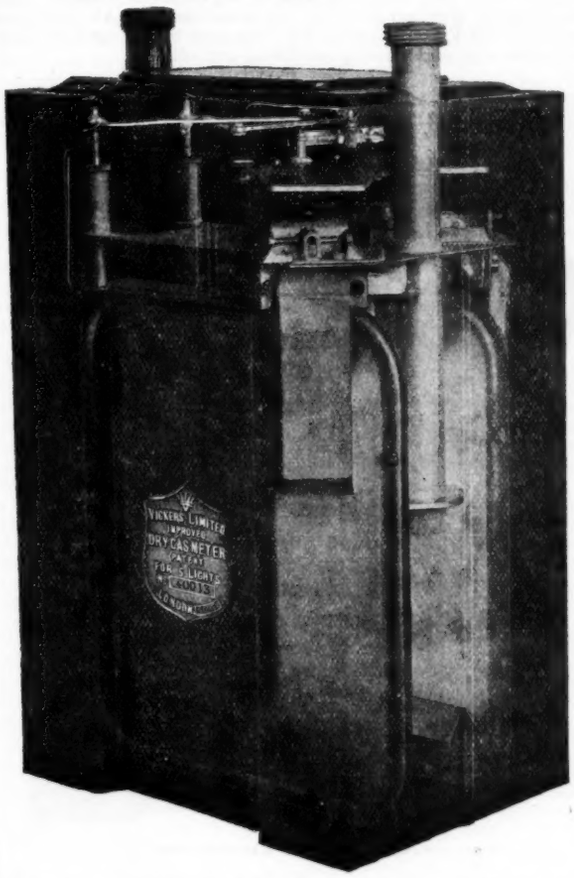


Fig. 2.—Ordinary Type—showing the Inner Mechanism in position relative to the Outer Casing.

Flag-Rods.—There are two flag-rods and tubes with stuffing-boxes and glands, and two sets of actuating arms top and bottom. One tube is attached near to the flange of the inner vessel of each chamber. The tubes form pivoting bearings or sockets for the flag-rods. The bottom of each tube is plugged and sealed. The top is provided with a stuffing-box and gland, through which the rod emerges—top end. Near the lower end of each tube is cut a slot communicating inwards with one of the vessels; and this slot permits the attachment of the bottom arm to the flag-rod, and also gives it sufficient clearance to oscillate at each pulsation of the diaphragm. The other end of the lower arm is attached to one of the metal discs of the diaphragm.

Platform.—This platform provides a base on which are mounted the ducts, valves, valve-grids, crank connecting-rod, worm and wormwheel, and spindle. The spindle is provided with a clutch which engages a similar clutch on the registration mechanism. The object of the clutch is to permit the withdrawal of the inner group from the casing without breaking any connections. The ducts, valves, and valve-grid openings are all of generous cross-section, and permit of a large flow of gas for the nominal rating of the meter. The movements and functions of the valves and valve gear follow generally on well-established practice for gas-meters.

Outlet Pipe.—This is firmly secured to the platform and ducts. To give further attachment, the pipe is extended and again

attached to a footstep secured to the measuring chambers. The bottom end of this pipe is capped and closed; the upper end of the outlet pipe passes through an opening in the top of the casing. When the pipe is in position, the opening referred to is covered and sealed by two half-collar pieces soldered in position.

Inlet Pipe.—This passes through the casing top, and is permanently attached to the same. The lower end of the pipe extends near to the bottom of the meter, and delivers the gas from the main into the space between the casing and the inner group. Both inlet and outlet pipes are located inside the casing, and in consequence the exterior of the meter is simple and compact.

Bridge.—The two measuring chambers are spaced and attached each to the other by suitable distance-pieces. They are also connected together by a Λ-shaped bridge-piece. The ends of this bridge are extended to span the full width of the casing; and when the mechanism or inner group is housed in the casing, the ends of the bridge are soldered to the side of the casing. In this way the whole weight of the mechanism is slung to the casing.

Registration.—This is driven by a spindle passing through a small stuffing-box, and connected by a one-point clutch to the worm spindle of the operating mechanism. No gas or moisture can pass from the casing to the registration chambers. Careful attention is given to this point and to adjustment of the packing, so as to seal effectively without objectionable friction. The registration mechanism is of the usual design. All parts are made by the Vickers Company in their own works and the construction and workmanship are sound and efficient.

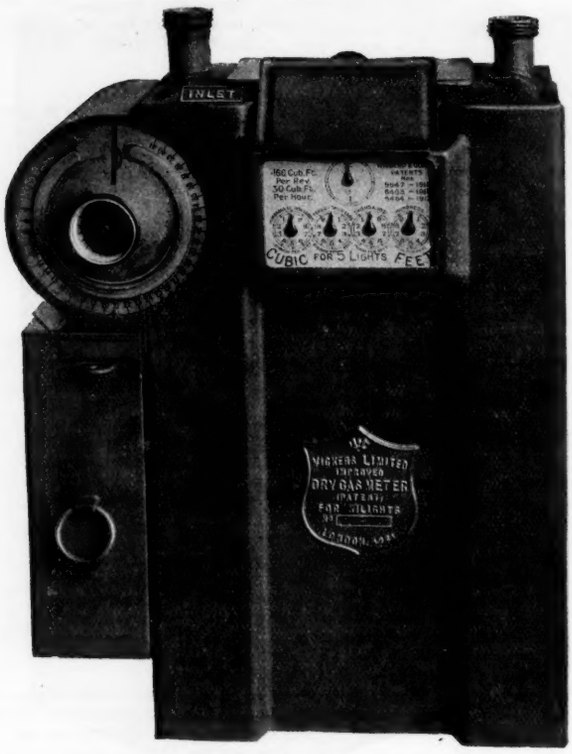


Fig. 3.—Prepayment Type—External Front View.

General.—All parts of the mechanism or inner group are made of heavily-coated tinned sheet. The valves and grids are of white metal or tin alloy. As an additional protection against rust or chemical action, all parts of the inner group are heavily electro-plated as the last operation prior to final assembly. The meter is designed on engineering lines, and is soundly built. It is compact and economical of external space. It has large valve and duct-channels; and in consequence it will pass, and register correctly at a pressure of 30-10ths, a volume of gas approximately 2½ times the nominal rating of the meter. An extreme test with open outlets gave over six times the volume.

Inspection and Repairs.—Access to the valve platform is obtained by unsoldering the top cap—not the top of the meter, but the cap attached to the top. If it be desired to withdraw the measuring chambers, the following operations are necessary. Unsolder the two half-collar plates round the outlet tube; unsolder the bottom of the casing; unsolder the two bridge ends. To gain access to the diaphragm, remove eight screws from the corrugated flange, and two screws from the duct of each outer vessel. The diaphragm consisting of membrane and discs is then fully exposed. To re-assemble, these operations are reversed. When the diaphragm is fully exposed, it will be seen that there is no puckering or crinkling of the membrane. The design is extremely simple, direct, and efficient. Its simplicity and directness are both of much greater value than could be adequately appreciated either from drawings or description; they need to be seen to be fully understood. When understood, it will be realized that to replace the diaphragm and parts is not a skilled operation. It could be carried out by any intelligent man or woman after a single demonstration.

THE PREPAYMENT METER.

[See Fig. 3.]

The main casing and measuring chambers are identical in the ordinary and prepayment types. The external dimensions are also the same. For the prepayment type a secondary casing is provided, and attached to the main casing at one side. The secondary casing provides a safe for the money-chest and a housing for the prepayment mechanism.

The meter comprises the following parts and features, additional to those of the ordinary type which are common to both. A change-price disc with coin-slot, both of which are visible and accessible from the front of the meter. The limit of change ranges from 5 to 42 c.ft. for one penny. The locking device is accessible from the front when the coin-chest is removed, and only then. The handle contains an index dial and pointer which indicate the cubic feet of gas prepaid and unconsumed.

The coin wheel is provided with 48 notches, which gives one notch per cubic foot of gas. The wheel has ratchet serrations and a pawl and spring. The ratchet pawl is mounted on the top of the wheel, so that in the event of the spring's breaking, the pawl would act by gravity. The hub of this wheel is screwed internally to correspond to the threads on the differential screw. The differential screw is square threaded, having three starts. It is supported at the inner end by a corresponding nut in the hub of the coin wheel, and in the outer end by a carriage sliding on guides. The carriage is provided with a tripping-pin which opens or closes the suppply valve.

A small spur-wheel is mounted and rigidly attached to the outer end of the differential screw; and this wheel engages with a pinion rod, the length of which corresponds to a sliding range of about 3 in., or to an equivalent prepayment of 400 c.ft. of gas on a penny basis or 4800 c.ft. on a shilling basis. The hub of the prepayment mechanism is also provided with an indicator tube having a spiral groove suitably arranged to actuate the index-pointer already referred to, and which is housed in the handle.

All parts of the prepayment mechanism, including the cut-off valve, are accessible from the outside without breaking the seal of the meter. The mechanism is protected by a cover attached to the secondary casing in such a way that the cover can only be removed when the coin-chest is opened. When preferred, the cover is supplied with a locking screw which is accessible from the outside; and the screw head can be sealed by the gas undertaking. The cut-off is reasonably slow, in order to give ample warning to the user.

The prepayment mechanism is driven by a worm and wormwheel which connects at one end to the crank-shaft and registration mechanism of the meter, and at the other end by means of a worm and wormwheel to the pinion rod already referred to. The connecting spindle is in two parts, connected by a one-point clutch. The spindle passes through the main casing, where it is carried and sealed in a stuffing-box accessible from the outside. The coin-chest and its accessories conform to the established practice for gas-meters.

The prepayment mechanism is a self-contained unit with its frame and bearings, and is well designed and constructed. It is robust, without being heavy or clumsy. It is soundly made, and all parts are machined all over. The framing only is of pressed steel, and all other parts of gunmetal or brass. The mechanism comprises facilities for a wide range of values and volume of prepaid gas.

AN INTERVIEW WITH MR. SAMUEL MOORE.

By Norton H. Humphrys.

As being associated in an extremely modest degree with the developments of carbonization in gas-works, as inaugurated by the research and experiments conducted by Mr. Thomas Settle at Exeter about twenty years ago, I was much interested in the Scunthorpe results [see "Journal" for Nov. 9, 1921], and in the description of further progress given by Mr. Samuel Moore at the recent meeting of the Eastern Counties Gas Managers' Association, as reproduced in the "Journal" of May 3.

Some of the advantages set forth in connection with the Moore gas-generator are not special to that type, but are mentioned as illustrating the possibilities of reducing the large number of details that must have constant attention in the retort-house, if the best carbonizing results are to be obtained. Among these are the clinkering of furnaces, cleaning retorts, and contingencies incidental to night and to Sunday labour. Where the magnitude of operation is so small that the manager must also act as retort-house foreman, the advantages gained during working hours are frequently discounted by slackness at other times. Any propositions in the direction of dispensing with the strenuous and grimy work included in attendance on ordinary horizontal retorts and generator furnaces, always accompanied with continual wear due to the friction of rakes and shovels and to rough contact with the chisel-edge of clinkering and scurfing bars, and with the escape of gas, soot, smoke, and flame that add to the thermal working losses, command the sympathetic consideration of all who are interested directly or indirectly in the manufacture of gas. The Moore generator is practically a closed vessel at all times, thus

dispensing with these inconveniences; and under such genial conditions as reduced temperature variations, no chilling blasts of cold air, no scraping, and no heavy chipping, a long working life, a gas-tight generator nearly to the last, and very moderate maintenance expenses may reasonably be expected. The process admits of great working elasticity in all directions, and is therefore adaptable to all sorts of conditions and materials, and to the production of any declared calorific value that may be required. The sectional drawings accompanying the paper above mentioned preclude the necessity for prefacing the following remarks with extended reference to structural detail.

The last nail was driven into the coffin of candle power regarded as a reliable measure of the value of gas to the user, by the introduction of the Welsbach incandescent burner. Yet that hindrance to carbonization development was everywhere evident in 1902, and was not removed until the passing of the Gas Regulation Act, 1920. The problem in the earlier period was simply the highest yield that could be obtained, subject to the limitations imposed by statutory requirements. An interesting example of the facilities now opened-up is furnished by a comparison of the claims put forward by Mr. Settle in 1904 with those now under consideration. Formerly, the make of gas per ton was necessarily confined within narrow limits. To-day, the therms per ton may range from 60 to 70 with straight coal gas from manually served horizontal retorts to three times this quantity with the aid of the cupola and mechanical power—provided that storage and distribution capacities are equal to dealing with the increased bulk that must follow as a consequence of reduced calorific value per cubic foot, and that the lower quality is both agreeable and acceptable to the consumers. Or under conditions not favourable in these respects, one-third to one-half of the total make may consist of a 300 B.Th.U. quality or thereabouts.

Having these considerations in view, much pleasure attached to acceptance of an invitation to spend a long evening with Mr. Moore, to inspect drawings and models, and generally discuss carbonizing problems, with special reference to the claims on behalf of the Moore generator. He has been twitted about great expectations; but there is nothing about him that pertains to an idealist with his head in the clouds, preferring flights of fancy to toilsome following of sober fact. He is a steady everyday plodder, strongly endowed with that sterling common sense that has made a success of so many gas undertakings against unfavourable circumstances. His designs are carefully worked-out on the lines peculiar to engineers not only accustomed to design gas-producing plant, but also to earn dividends by its operation, and readily identified by liberal provisions in the way of cleaning doors and facility for barring into every crevice and corner. Apart from the coal breaker and elevator, there is only a winch-handle for regulating the admission of coal to the generator at the top, and a mechanically-driven coke-extractor, geared to a receiving and tipping platform at the bottom, in the coke receptacle. Neither coal nor coke is subjected to rough handling, or to a long drop; and the coke need not be removed oftener than once in eight hours or so. It is automatically discharged as required, at a height above the floor that can readily be adapted to suit any pattern of coke-conveyor.

The normal condition of working is a full retort, and feed from a reserve in the coal-hopper, controlled by the rate at which coke is removed by the extractor at the bottom; but operations can be adjusted, if required, to anything between a full retort at all times and entire intermittent working. The full retort prevents secondary decomposition due to radiation of heat from incandescent surfaces; and the coal in the upper part acts as a filter, retaining heavy and partly condensed hydrocarbons that otherwise might get away into the tar-well. Hence the high yield of ammonia—unfortunately not of much account at the present time—and a tar approaching dehydrated in quality, which is of more importance, especially if the gas-works is a considerable distance from the railway or from the distillery.

The smaller velocity of the current of blast gases at the exits, due to the large horizontal area of the water-gas chamber, and the large number of outlet ports, reduces the carrying-forward of fine siliceous dust into the heating chambers; and with the aid of the clearing devices provided, the checker-brick will go for a long time before requiring to be removed and cleaned.

Mr. Moore is not among those who pin their faith to complete gasification without the production of residuals as the *ne plus ultra* of gas manufacture, but is out to regulate the production of residuals to fit the current market conditions. If coke and tar can be sold at 2d. per therm, as calculated on the calorific value, and coal, oil, &c., are cheap, there may be little, if any, additional profit to be obtained by converting them into gas. Or the quantity of coke that can be gasified may be limited by the calorific value of the gas to be supplied.

Reference is made in the paper to a regulating device not included in the illustrations, for enabling the supplies of secondary air to follow a variable speed during the progress of the "blow," in sympathy with the steady rise of temperature, or in like manner the supply of steam during the progress of the "run."

It is not too much to say that gas engineers everywhere are waiting with keen interest the publication of working results, when the first complete Moore installations are erected. From all I have seen and heard, I have no hesitation in expressing the opinion that this system of carbonizing coal possesses a number of patented features that are quite unique, and well designed to secure the advantages claimed by Mr. Moore.

THE AB-DER-HALDEN PROCESS OF TAR DISTILLATION.

POSSIBILITIES FOR THE SMALLER GAS-WORKS.

[A Communication to the "Journal des Usines à Gaz."]

IN sending to our French contemporary a description of his new process of coal-tar distillation, "applicable to gas-works," M. Ch. Ab-der-Halden points out that of all the bye-products of gas making it is only tar which is usually sold in the crude state, whereas ammoniacal liquor is almost always worked-up, and even waste material is washed for the extraction of prussiates.

In France, except in the case of four large undertakings, the tar is disposed of in its crude state; and it must be admitted that attempts to work it up have usually stumbled across unsolved difficulties. It has been said either that tar products cannot realize a price to justify their preparation, or that refinement is too delicate an operation to be undertaken by a works having no specialist personnel. A glance down the market values of tar products, however, will rule-out the first objection—in fact, a rough calculation shows that gas-works tar can divide as to 60 p.ct. of pitch worth 1·33 times as much, and 40 p.ct. of oils worth 3 times as much as the original crude product. It is, then, the technical difficulties of distillation which prevent its practice spreading in gas-works—other than in "super-stations," which can run a regular chemical works. The author realized the refinements of such stations were hardly practicable for the average works, but set out to find some intermediate process whereby simple but marketable products were obtained.

PECULIARITIES OF TAR DISTILLATION.

Tar distillation would appear on the face of it a very simple matter. Theoretically it should suffice to raise its temperature to the higher boiling-points of the heavier oils successively; the final residue being pitch. Practically it does not turn-out thus; and one need only try distillation in a glass retort to see the industry's difficulties. Actually, as soon as the temperature passes 100° C., the water content throws the mass into an emulsion which overflows the vessel; and extreme caution must be exercised to drive-off the water without sending-over tar. Dehydration having been effected, progress is easier; though the complexity of the hydrocarbons present causes variation of the distillates according to the slightest variation in the intensity and rapidity of heating. In fact, identical conditions are essential in obtaining similar results even from two experiments. To bring-over the higher fractions, the tar has to be heated beyond the melting-point of the glass apparatus.

These peculiarities in the laboratory experiment are reproduced in industrial practice. To start with, the dehydration calls for great precaution, to prevent dangerous irruptions; and special apparatus has to be designed to this end. Then, frequent tests are necessary to ensure characteristic fractions—hence the need for a trained staff. Finally, provision must be made for the high temperatures reached in distilling-over the heavy oils, for otherwise the apparatus will deteriorate, and the pitch become worthless. It is obvious, then, why the medium sized undertakings, which cannot find the capital for expensive plant and personnel, have so far met an insurmountable obstacle. Some other method had to be devised.

VOLATILIZATION BY STEAM.

Returning to the laboratory experiment, suppose water-vapour at 100° C. is passed through the tar, and the products of such distillation are condensed. It will be found that the condensate consists of a mixture of light oil and water—the former at first about 50 p.ct. of the condensate, but gradually diminishing to practically nothing. Then raise the temperature of the tar and at the same time superheat the water-vapour to the same degree. Distillation of a new fraction of oils takes place, and again proceeds till no more comes over. And so on; a definite oil fraction corresponding to each upward step of tar and steam temperature. It will be found that distillation is finally completed at 250° C., whereas by the former method it was necessary to work up to 400° C. This experiment is simply the application of the process of steam distillation.

It is well known that in distilling a mixture of water and a volatile liquid (uncombined), the phenomenon of ebullition is governed by the following laws: (1) The temperature at which it commences is below the lower of the boiling-points (at atmospheric pressure) of the components. (2) The respective quantities of water and of the volatile distilled over are proportional to the vapour tensions of the two at the temperature of ebullition of the mixture. These laws show that by the action of water-vapour at 100° C., all the volatiles may be carried over; but the lower their vapour tension, the more difficult will it be below that temperature. The light oils volatilize easily—50 grms. of water-vapour sufficing to carry 100 grms. of oil; but fractions boiling at 200° to 250° C. require 8·66 times, and 300° to 350° C. fractions 115 times their weight of water-vapour below 100° C. In practice, therefore, it is impossible to work at 100° C., and the temperature must be raised to obtain a high enough vapour tension. Experiment has shown the author that such temperature never exceeds 250° C.

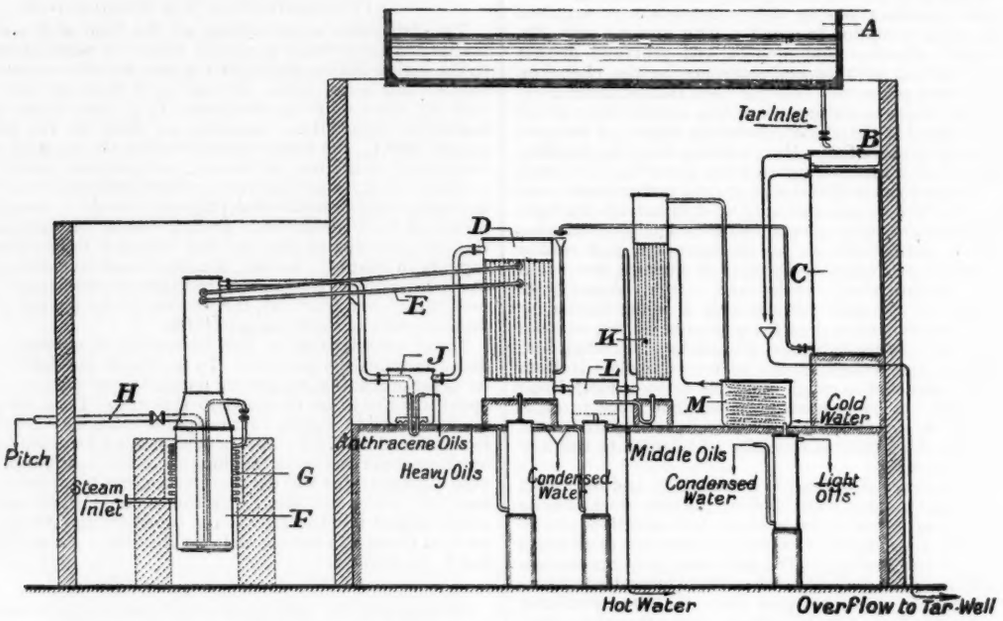
INDUSTRIAL APPLICATION.

The above facts show that water-vapour passing through the

tar takes off a portion of it, and leaves a residue of pitch; and empirically, therefore, the tar may be regarded as consisting of a volatile portion that yields to steam distillation, and a fixed portion unaffected under the conditions of the experiment. Accordingly, industrial application of the process is volatilization by steam followed by fractional condensation into products of commercial value.

The illustration shows the general arrangement of the apparatus devised by M. Ab-der-Halden to achieve his object—continuous distillation within the scope of the moderate sized and smaller gas-works. The tar is run from a tank A through a filter B into a settling-tank C, whence it flows into a dehydrator D. The latter consists of a tubular condenser maintained at a temperature over 100° C. by the products of the ensuing distillation. Here the tar parts with its water and light oils, and then passes through the pipe E into the still. This comprises a retort F heated to the desired temperature, and above it a column in which the tar trickles down over packing. Water-vapour, superheated in the coil G, passes right through the still from bottom to top, and causes volatilization of the fractions corresponding to the working temperature. The pitch collects and rises in the still until evacuated continuously (as soon as it reaches a certain level) through the pipe H. Thus the first phase of the operation—separation of the pitch and the volatiles—has been carried out.

The mixture of volatiles and water-vapour leaves the still usually at a temperature between 150° and 170° C. It is led into a separator J, in which, by natural air-cooling assisted if necessary by circulating cold water, the temperature falls to 130° or 140° C. The resultant condensation separates what is known as "anthracene oil." Thence the remaining vapour mixture enters the dehydrator D, and is further cooled by giving-up its heat to the crude tar being dehydrated. The mixture falls to 100° C. during this process, and fresh condensation is realized—this time of "heavy oils." The still-uncondensed vapour undergoes renewed treatment in a tubular condenser K fed with cold water; a valve controlling the inlet to a vessel L in which a third fraction, the "middle oils," separate out. The most volatile portion of the distillate remains; and this is carried over to a final cooler M, from which "light oils" are run off. Thus, by the rough separation of the pitch and graded condensation of the volatile components, the crude tar entering the apparatus is fractionated by a continuous process into five parts—pitch, anthracene oils, heavy, middle, and light oils.



GENERAL ARRANGEMENT OF APPARATUS FOR THE AB-DER-HALDEN CONTINUOUS PROCESS OF TAR DISTILLATION.

It will be remarked that this method of tar treatment is exactly the reverse to the usual proceedings; for whereas the latter progressively raises the temperature in order to separate the less and less volatile fractions, the Ab-der-Halden process raises the original tar to the maximum temperature required, and grades down the condensation to finish with the lightest volatiles.

The various oils obtained as above contain solid products—anthracene and naphthalene—which should be recovered for sale; and this is accomplished in cooling tanks, where they crystallize out. The clear oils may be drawn-off and stored.

Characteristics of Tar Products and their Utility.

As has been pointed out, a gas-works of but moderate size cannot bind itself down to refining the bye-products of tar; and some direct outlet for them must be found. It may, therefore, be of use to indicate their main properties and the markets which exist for them.

Anthracene Oils.—In the crude state these are in the form of a muddy liquid. Prolonged decantation separates clear oil of density 1·090 to 1·10 from a very thick anthracene emulsion. The oil finds ready use as a fuel and as an antiseptic wood preservative. The paste can be filtered, rendering clear oil and crude anthracene that can be mixed with pitch.

Heavy Oils.—According to the composition of the distilled tar, these are either fluid or slightly pasty with anthracene. In the latter case they must be decanted as before. The clear oil, density 1·045 to 1·060, is admirable Diesel engine fuel.

Middle Oils.—These in the crude state contain practically all the naphthalene, the proportion of which in gas-works tar is about 50 p.ct.; and cooling to the lowest possible temperature is necessary to crystallize it out. The clear oil drawn-off (density 1·01) contains 20 p.ct. of phenols, and serves excellently for benzole scrubbing. The naphthalene, on drying, is a white crystalline powder. It is possible to simplify the treatment of these bye-products by taking the heavy and middle oils together, in which case the mixture corresponds exactly to the creosote oil used by railway companies.

Light Oils.—As distilled by steam volatilization, the light oils present no similarity to those produced by the direct method. The reflux process, acting as a dephlegmator, causes a primary fixation, and imparts the characteristics of crude, unwashed benzole. Hence they may be used direct in varnish manufacture, or as fuel for internal combustion engines.

Decentralization.

The author of this short descriptive article seeks to show that tar treatment is as well within the reach of gas-works as is the working-up of ammoniacal liquor. His experience proves that any undertaking producing over 500 tonnes (1 metric tonne = 0·9842 ton) of tar a year can usefully adopt the principle; and the Ab-der-Halden process is actually functioning in three works which treat 100, 1000, and 4000 tonnes a year respectively. Works are at present sending their tar to large central distilleries, which can afford to send the bye-products far, but which have to stock large quantities of pitch. It would surely be more logical to effect primary fractionation at the source, leaving final working-up to the central refineries.

Without doubt, the author concludes, such a procedure would tend to develop in France the coal-tar industry, the importance of which has been manifested so patently of recent years.

Dayton Oil-Gas Process.

There has lately been installed at the works of the Plymouth (Mass.) Gas Light Company a Dayton process gas-making apparatus, which almost doubles the capacity of the works. The gas is made in closed chambers, which are heated to 1600° Fahr. Oil is admitted to the retorts with just sufficient air to burn a part of the gas; and this keeps-up the heat in the retorts, so that the process of making gas is continuous until the holder is filled. The starting and stopping of the gas-making process is very simple, and consists of starting the compressor unit and regulating the oil and air valves. The heating of the apparatus takes about half-an-hour after the machine has been shut-down overnight. When the gas leaves the retorts, it is passed through scrubbers and tar-extractors and then enters the relief holder. It is taken from this holder as needed, and mixed with coal gas.

CARDIFF GAS COMPANY'S SUCCESS.

First Prize in Window-Dressing Competition.

The recent Shopping Week and Trade Pageant at Cardiff afforded the Gas Company an opportunity (of which they took full advantage) to display their wares to an enthusiastic public. Tradesmen vied with each other in really fine window displays (offering numerous gifts to fortunate holders of winning numbers) and extensive advertisement in the Official Handbook. Moreover, the Trade Pageant brought out some highly effective decorative schemes, which were interspersed with just that spice of humour needed to make the show attractive.

THE SHOWROOM WINDOW WHICH SECURED A FIRST PRIZE.

THE CARDIFF GAS COMPANY'S DECORATED LORRY WHICH TOOK PART IN THE PAGEANT.

The ample proportions of the Gas Company's window enabled, as will be seen, a well-designed and educational display to be arranged. This consisted of scale models showing the process of manufacture, with specimens of residual products; and, in addition, there was a comprehensive and classified collection of chemicals, dyes, and drugs—everything being clearly labelled and described. Of course, room was found for cookers, circulators, and fires, with appropriate descriptions. This window display gained a first prize; while in the voting for the most pleasing and effective advertisement in the Handbook, the Company's page also came in first.

An illustration is also given of the decorated lorry, showing on one side a gas-cooker, gas-fire, and circulator in a kitchen fireplace, and on the other a washing copper, with a cooker on a stand and hotplate at the side. The "chef" in attendance proved a great attraction.

Over 700 shops entered the window-dressing competition; and this shopping week was the largest enterprise on record. The traders in general and the Cardiff Gas Company in particular have reason to be satisfied with the results of their efforts.

WOOD CARBONIZING.

The manufacture of charcoal by carbonization is, says the "Gas Age-Record," an old industry; but the present methods of wood distillation for the purpose of recovering the volatile products are comparatively modern, and the industry in the United States dates from about the middle of the nineteenth century. The industry is divided into two distinct branches—hard-wood distillation and soft-wood distillation. The principal basic products obtained from the hard woods by distillation are crude wood alcohol, charcoal, acetates, tar, and tar oils. Many of the plants are converting their primary products into more highly manufactured forms; and some products that were wasted in the early stages of the industry are now saved. The principal products obtained from distilling the soft woods are rosin, turpentine, tar, tar oils, charcoal, and wood creosote. The wood-distillation industry has gone through several stages of development since it was established in the United States. Brick kilns were first employed to recover the condensable gases which were lost in burning charcoal in the old wasteful pits. This kind of equipment is still being utilized; but a great step forward was made when the use of iron retorts, built in pairs, was inaugurated. Large rectangular ovens or retorts represent a still later improvement; and these are being installed in connection with many of the bigger plants, in place of the iron retorts.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Annual General Meeting.

The Annual General Business Meeting of the Association was held on Friday last, at the Westminster Technical Institute—Mr. Frederick A. Frost, of the South Metropolitan Gas Company (the President), in the chair.

The Hon. Secretary (Mr. George Winslow) having read the minutes of the general business meeting held in May, 1921,

The Hon. Treasurer (Mr. A. Broadbent) submitted the financial statement for the session.

Report by the President.

The President then made a report to the members on the work of the Association during the session, which he prefaced by the remark that the present membership roll is about 250. The applications for membership received during the session would (assuming they had been accepted) have permitted of a substantial increase in their numbers. The non-acceptance of several applications was in accordance with the decision, made at the last annual general business meeting, to interpret more strictly than had hitherto been the case the rule setting-out the necessary qualifications for admission. To meet certain instances of possible hardship, it was at that time decided to create another grade with the appellative "associate member," to which class fourteen of the admissions had been elected.

Commenting upon the exceedingly good attendances at the meetings during the session, the President referred briefly to some of the items of interest which had been included in the programme. For the inaugural meeting of the session, he said, the Council were fortunate in enlisting the services of Mr. G. M. Gill, the Chief Engineer of the South Metropolitan Gas Company, who delivered an interesting and instructive discourse on a variety of matters relating to carbonizing practice in the United States. The fact that it was based upon his personal observations, made during a tour of that country for the specific purpose, rendered the contribution a valuable addition to the "Transactions" for future reference. Subsequently Mr. S. B. Langlands, Inspector of Lighting to the Glasgow Corporation, addressed a large assembly of members on the Gas Regulation Act, and its effect on the industry. The desirability of devoting an evening to the consideration of this topical subject had been previously intimated; and the Association were fortunate in securing the services of that gentleman. The address he delivered was much enjoyed by the members, and was of an impromptu character, and dealt with a wide field of Gas Legislation relevant to the matter under review. The address by Mr. H. Seabrook, at the January meeting, brought to notice the possibilities of an additional field for utilization of the industry's most valuable bye-product, in the interests of the community. It was encouraging to learn that the value of coke, as a means of alleviating the nuisance of atmospheric smoke pollution, is engaging the serious attention of their electrical contemporaries. The importance of this subject is such, that, on the evening of its presentation, the Association received the welcome support of several gentlemen prominently identified with both industries. Carbonizing, which was the subject of the paper presented by Mr. J. S. Thorman in March, well merits the attention that has been given to it by prominent members of the industry, through the medium of the Technical Press. The plea he put forth—urging gas undertakings, in their own interests, to reconsider the now antiquated methods of coal purchasing, which have, in many instances, been so abused—has received the support of many prominent gas engineers. Further developments in this direction are more than probable; for, through Mr. Thorman, the information has been imparted, by the means he illustrated on that occasion, that it is possible to obtain samples of coal from bulk in such a manner that has met with the entire approval of several colliery undertakings. For the claims of gas as a lighting agent, the Association were fortunate in obtaining the services of that able exponent, Mr. J. W. Lofts, of Messrs. W. Sugg & Co. That gentleman demonstrated, in no uncertain manner, that in many of the instances where electricity has appreciably supplanted gas for lighting purposes, the apathetic attitude of the gas undertaking concerned has been a contributing cause. This address provided a fitting conclusion to the series of monthly meetings—emphasizing, as it did, the need for energy and initiative on the part of all concerned in that field of gas supply upon which the fortunes of this great industry were founded.

As to the visits of the session, these were, as the President proceeded to point out, of an exceedingly valuable character. At the Kensal Green station of the Gas Light and Coke Company, he said, the extensive installations of the Woodall-Duckham continuous vertical retort system presented a unique opportunity to members of studying the developments made in this method of carbonizing practice since its inception. On that occasion, the members were shown one of the earliest installations of this system, together with another which had just been put into operation. The latter example, it was pointed out, embodied all the improvements made as a result of the experience acquired through the intervening years. In March a record number of members participated in a visit to the Old Kent Road works of the South Metropolitan Gas Company, when Mr. Gill delivered a seasonable address, embracing a number of practical points calculated to produce a high state of efficiency in carbonizing and allied matters. In visiting the same Company's chemical works at Phœnix Wharf, an opportunity was provided for the members to acquaint themselves with the latest developments in sulphate of ammonia manufacture. The Company's patented process for the production of neutral sulphate came in for special observation. This product, it is anticipated, will in time displace that of the acid variety, the manufacture and use of which has many attendant disadvantages. The details of the plant, and the *modus operandi*, were explicitly demonstrated to the members by Mr. P. Parrish and his assistants. The visits to the London showrooms of the Davis Gas Stove Company, the works of Messrs. Glover & Main, and the Volker Lighting Corporation were, in every sense of the word, successful ones. In each instance it must have been apparent to all who attended them that neither pains nor expense had been spared by the management in organizing the arrangements so as to ensure as thorough an inspection of the various processes in operation as possible, within the limits of the time at disposal. Another happy and important feature in connection with the visits is the impromptu addresses on topical matters from the principals of the firms concerned, which are invariably given at the conclusion, and are very highly appreciated by the members. Viewed from an educational standpoint, the importance of the visits to industrial establishments who cater for the industry's requirements is deserving of even greater recognition. It is in some respects to be regretted that the prevailing labour conditions are such as to render it impossible to arrange these fixtures, as was formerly the case, on Saturday afternoons. From the excellent attendances recorded at these mid-week functions, during the session, it is quite evident that leave to do so has in many instances been granted in a very liberal manner. In taking this opportunity of expressing the thanks of the Council to the persons responsible for these concessions, the President coupled with them the intimation that it was his firm conviction that the time so given has, in every case, been profitably spent, and that the knowledge so gained may be regarded as being of mutual benefit to all concerned.

Junior Joint Council.

Mr. Frost stated that a meeting of the Joint Council of the English Junior Gas Associations was held at Leeds last November, and was attended by two members of the Executive. On that occasion a number of matters affecting the welfare of the kindred Associations were discussed. Considerable progress has been made in endeavouring to co-ordinate the rules and procedure of each body, in such a manner as to enhance their status and utility. Mr. J. G. Clark (in his capacity as Hon. Secretary of the Committee consisting of representatives of the Junior Associations which was formed to consider certain educational questions at the request of the Institution of Gas Engineers) reported that the progress made up to that time had been of a satisfactory and encouraging character. Further, he informed the Council that the final Committee for dealing with this question was in course of formation. Five of the seats on this Committee have been placed by the competent authorities at the disposal of the Institution, who have generously invited the Junior Associations, through the Sub-Committee and Joint Council, to elect representatives to fill two of the five. This recognition, coming as it does from the parent body, is an honour which, it need hardly be said, will be highly appreciated by the Associations concerned. The selection of these two members was a matter to which the Council gave serious consideration; and eventually Mr. S. B. Chandler, of London, and Mr. E. L. Oughton, of the Yorkshire Association, were unanimously elected. Both of these gentlemen have rendered signal service to their respective Associations, and are in every respect worthy of the honour bestowed upon them.

Work of the Association.

In the course of some general observations upon the affairs of the Association, the President urged the members to take keener interest in the election of officers—the absence of nominations on the present occasion leaving the Council with no alternative but that of proposing and electing nominees of their own. Again, unfortunately at the end of each session it is the invariable experience to find that there are still due to the Association a number of subscriptions from members who have no recorded attendance to their credit. The loss to the exchequer in respect of these cases is greater than it may appear at first sight. To say nothing of the non-forthcoming subscriptions, there have, throughout the session, been provided for such members items at the expense of the Association's funds. For some years past there has been an annual average of approximately 25 of such instances. Assuming that this leakage of resources was stopped, the money thereby saved might be profitably utilized in a variety of ways, which would enhance the value of the Association to the members. Suggestions for effecting this desirable end are not wanting—one being the provision of a library of technical works relative to the various branches of the industry. This project, which was first mooted some ten years ago, has remained in abeyance too long; though meanwhile it has lost none of its importance.

Regretting the paucity of papers contributed by members, Mr. Frost said it is admitted that the preparation of a paper to which the whole of an evening might be devoted for its profitable study is no light task. Nevertheless, it is necessary, in their absence, to be prepared with an alternative, if gaps in the programme are to be avoided. "That we can," he proceeded, "when the necessity

arises, substitute an equally attractive feature, has been amply demonstrated during the session. The two occasions upon which three papers were submitted for discussion in the course of an evening were, in the opinion of all who attended, an unqualified success. My own opinion, after a scrutiny of the contributions, was that, although the subjects in question had been purposely abridged (to limit the time occupied in their delivery), they had by no means suffered in the process. The essential points of importance, upon which the authors in their reasoning anticipated that our thoughts would be directed, were, in each instance, clearly and concisely incorporated in the text. The varied and animated character of the long discussions they gave rise to, may be cited as evidence supporting this view. The preparation of such papers need present no difficulty to any of our members. The wide field of our industry, throughout which we are distributed, is, in itself, sufficient to ensure variety; and, when taking into account our members, it would indeed be a matter for surprise if at any future time a dearth of this excellent type of contribution was experienced. I would urge you all to give the matter of submitting these papers your serious attention. It may not have escaped your notice that out of six such papers read during the session, the authors of five were members of the Council. This connection may, or may not, be a coincidence. As to whether this happens to be so or not, is a matter which I prefer, on second thoughts, to leave to your conscience."

Satisfaction was expressed by him at the fact that the Council had been successful in prevailing upon Mr. Winslow to continue to perform the duties of Hon. Secretary for a further period. Unfortunately this has involved his resignation from the Vice-Presidency, for the time being at any rate; but the course he has taken has tided the Association over what at one time looked like being a critical period. Mr. Leonard Lacey has kindly consented to do what he can to relieve Mr. Winslow by taking up the position of Assistant Hon. Secretary.

Mr. H. W. KERRIDGE (Croydon), proposing the adoption of the report, said they were concluding one of their most successful sessions. The Association was one of which they ought all to be exceedingly proud.

Mr. A. E. ALLEN (Commercial Gas Company) seconded the motion, which was agreed to.

Mr. J. R. GALE (North Middlesex Gas Company) moved a vote of thanks to the officers and Council, which was seconded by Mr. W. T. KENSHOLE (Lea Bridge), and acknowledged by Mr. F. E. WOODFINE (South Suburban Gas Company).

TESTIMONIAL TO MR. FROST.

Mr. F. J. PEARCE (North Middlesex Gas Company) said Mr. Frost had been an excellent President; and it would be the heartfelt wish of every member of the Association that he should in his future career meet with every success. He had great pleasure in moving that the following testimonial be suitably emblazoned, framed, and presented to him:

> "This testimonial is presented to Mr. Frederick A. Frost as an expression of the sincere esteem and great appreciation of the Council and members of the London and Southern District Junior Gas Association, of the earnest work accomplished by him during his year of office as President, 1921-22. His high ideals, together with much professional knowledge and great devotion to duty, have still further enhanced the reputation of the Association in our industry. In this conveyance of heartfelt and grateful thanks, the members also express sincere wishes for a continued successful career and the enjoyment of splendid health."

Mr. W. J. LIBERTY, in seconding, agreed that Mr. Frost had been a real good President.

The PRESIDENT thanked them all sincerely for the kind manner in which they had expressed approval of his work for the Association. He had been astonished during his year of office to learn how much the work carried on was appreciated by those holding exalted positions in the industry. He had not known before that their proceedings were watched through the Press in such a manner as he found was the case. This appreciation should incite them to attempt still greater things. The importance to the gas industry of the Junior Associations was every day increasing. His only regret in connection with his year of office was the unfortunate fact that it had happened to coincide with a period of ill-health which had prevented him accomplishing all that he had set out to do.

NEW OFFICERS.

The election of the following office-bearers for the next session was announced:

President.—Mr. D. C. Cross, Assoc.M.Inst.C.E., Lea Bridge District Gas Company.

Senior Vice-President.—Mr. W. Grogono, Gas Light and Coke Company.

Junior Vice-President.—Mr. W. N. Booth, Assoc.M.Inst.C.E., Woolwich Arsenal Gas-Works.

Hon. Secretary.—Mr. George Winslow, Gas Light and Coke Company.

Assistant Hon. Secretary.—Mr. Leonard Lacey, Assoc.M.Inst.C.E., Gas Light and Coke Company.

Hon. Treasurer.—Mr. A. Broadbent, Gas Light and Coke Co.

Hon. Auditor.—Mr. E. G. Merry, Gas Light and Coke Co.

Council for 1922-23.—Messrs. Leonard Lacey, W. L. Westbrook, L. E. Wellard, H. W. Kerridge, F. E. Woodfine, T. V. Johns, T. J. Beardmore, and W. T. Kensholе. *Ex-Officio:* Messrs. F. A. Frost and F. J. Pearce.

REGISTER OF PATENTS.

Manufacture of Ammonium Sulphate.—No. 156,170.

KOPPERS COMPANY, of Pittsburgh (Penn.), assignees of SPERR, F. W.

No. 36,664; Dec. 31, 1920.

This invention is designed to produce ammonium sulphate which is practically free of free acid. It has been proposed to neutralize acid ammonium sulphate crystals by treating them with ammonia gas, or by washing them with a saturated solution of ammonium sulphate rendered alkaline with pure ammonia solution, or by washing them with a saturated neutral solution of ammonium sulphate, which may be obtained by neutralizing the acid mother liquid extracted from the sulphate crystals under treatment, the neutralization being by means of pure ammoniacal vapours.

According to the present invention, ammonia vapours are withdrawn from the fixed section of the ammonia still, and the crystals are treated with the vapours. The vapours may be formed into a liquor which may be regulated as regards its strength and temperature, and the crystals washed with the liquor.

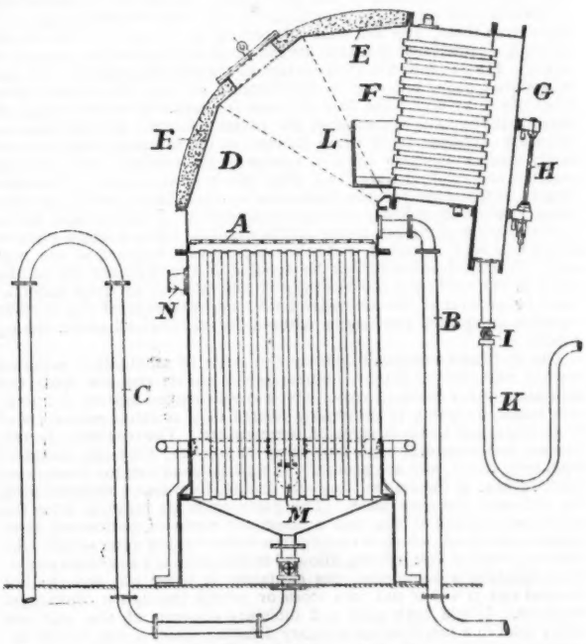
The claims of the patentees are as follows: In the process of manufacturing neutral ammonium sulphate, withdrawing vapours from the fixed section of an ammonia still, condensing and concentrating the same, forming an ammonia liquor therefrom, regulating the strength and temperature of such liquor, and treating the crystals with the liquor, for the purposes specified.

Manufacture of Neutral Sulphate.—No. 177,726.

SOUTH METROPOLITAN GAS COMPANY, of Old Kent Road, S.E., and PARRISH, P., of Blackheath.

No. 12,116; April 27, 1921.

In specification No. 141,819 it is stated that in washing crystals of ammonium sulphate with a solution of ammonia obtained by condensing the vapours from a fixed ammonia still and diluting the condensate, a particularly suitable diluent is obtainable by withdrawing, under reduced pressure, vapour from the waste liquor from a fixed ammonia still and condensing it. It has now been found that it is unnecessary to disturb the normal working of the fixed ammonia still by withdrawing ammonia vapour from it for this particular purpose, since it is possible by proper selection of conditions to obtain all the ammonia required for neutralizing the sulphate, and at the suitable degree of dilution, from the waste effluent from the fixed ammonia still. In this manner an increase in the output of sulphate is achieved, nuisance is minimized, and the working of the distillation plant is not disturbed.



Parrish's Ammonia Vapour Condenser.

According to the invention the ammonia is withdrawn from the effluent liquor on its way to settling ponds or the like, while the hot liquor flows over a surface and is then directly chilled by passage through a cooler. It is found that by arranging a suitable condenser in direct communication with the chamber containing the surface over which the hot liquor flows, the pressure in the chamber is sufficiently diminished for the withdrawal of ammonia from the liquor without any further suction. There is also the incidental advantage that by using boiler feed-water to cool the hot liquor immediately it has left the said surface, thermal economy is effected in the working of the distillation plant.

Suitable apparatus is shown diagrammatically in the accompanying drawing in vertical section. It comprises a tubular feed water heater having above its upper tube plate a perforated distributing plate A, on to which is discharged through pipe B the hot waste effluent from the

fixed ammonia still; the effluent being kept at this level by a rising out-flow pipe C. Surmounting this heater is a chamber D, preferably suitably lagged as at E, and having as a part of one side of it the tube plate F of a multi-tubular condenser which discharges into a closed receiver G.

The ammoniacal steam rising from the surface of the liquor in the chamber condenses in the condenser; and thus a reduced pressure is maintained within the chamber. When a certain amount of condensate has collected in the receiver G, as indicated by a gauge glass H, valve I in pipe K is opened to allow the condensate to flow into a tank. L is a trap which prevents return of condensate to the chamber when the receiver is more than normally charged.

The feed-water enters the heater A at M, and leaves it at N.

Attaching Globes to Gas-Brackets.—No. 177,565.

Selas-Turner Company, Ltd., of Coventry, and Turner, E., of Urmston.

No. 32,843; Nov. 22, 1920.

This invention is particularly applicable for incandescent burners using pre-mixed gas and air; and in one convenient manner (and as applied to burners forming the subject-matter of patent No. 115,490) a metal washer is threaded on to the burner pipe above and resting upon the burner proper. This washer is formed with projecting arms or claws, preferably four in number, which are bent downward and near their extreme ends outwards. The downward part of the arms lie in a circle equal to the hole in the top of the globe, which has an overhanging flange resting on the outwardly turned ends of the arms.

The globe is preferably formed of fused silica somewhat bell-shaped, and with a through hole at the top which embraces the downward portion of the arms; the latter constituting a self-centreing device to hold the globe steady relatively to the mantle. The arms are slightly springy, so that there is no liability for the globe to rattle on its support, although it is free to be raised without detaching any part of the burner or globe support when desired.

Manufacture of Sulphate of Ammonia.—No. 178,046.

Lessing, R., of High Holborn, W.C. 1.

No. 26,440; Oct. 6, 1921.

In the manufacture of sulphate of ammonia it is customary, remarks the patentee, to remove the product from the saturator bath by "fishing," ejecting, or running it in form of a paste which is placed on a draining table. This paste consists of a mixture of crystals of ammonium sulphate (as formed in the saturator at elevated temperature) and mother liquor in varying proportions to each other. The mother liquor is usually of a more or less acid reaction, and has dissolved or suspended in it the bulk of the impurities. In ordinary practice the crystals are left on the draining table until no more mother liquor will drain from them, and are then heaped-up in a store or are passed through a centrifugal machine for the removal of a further quantity of liquor. He has found that the action of the draining table is not one of drainage only, but that a considerable amount of crystallization takes place, by which the flow of liquor is retarded or entirely stopped. Investigations have shown that the crystals formed on the draining table are different from those formed in the saturator, and that the newly-formed crystals have a tendency to interlock and cement together the original ones, and that this crystallization is therefore largely responsible for the formation of hard lumps which are frequently found in ordinary sulphate of ammonia. Furthermore, by the crystallization of mother liquor on the draining table, a large portion of the free acid, moisture, and other impurities is retained in the product. These drawbacks can be avoided if the temperature of the paste as removed from the saturator is not allowed to drop substantially below that of the saturator bath; and drainage of the mother liquor is completed practically without further crystallization taking place.

The invention consists in placing the paste of ammonium sulphate crystals and mother liquor, immediately upon its removal from the saturator, into a draining vessel which is well lagged against temperature losses, or which is preferably heated in a suitable manner, and in allowing it to drain at elevated temperature. The resultant crystals contain less moisture, acid, and other impurities; they are detached from each other, and are generally in a better condition for subsequent centrifuging, or for neutralizing and drying, than those obtained from the ordinary draining table. The paste upon its removal from the saturator is ladled or run into a container made of perforated acid-resisting material, which is resting in a steam-heated outer vessel—the draining mother liquor being allowed to pass through a suitable outlet. After draining is completed, the container is lifted out and the hot drained salt is either put into store or passed through a centrifugal machine. While both acid and moisture contents of the salt are lower than in a salt from an ordinary draining table, it may still be desirable to neutralize the last traces of acid and remove all moisture, and in this case it is preferable to treat the salt when it is still hot.

The above draining arrangement is only one of a number suitable for carrying out the invention. For instance, an ordinary steam-heated boiling pan fitted with a suitable grid and bottom outlet may be employed. This should be preferably of the tilting pattern for the convenience of discharging the salt after drainage. Another form of vessel which may be used can be constructed on the lines of the customary draining table by fitting this with a steam-jacket or coils, and by a suitable cover protecting the top of the salt layer from cooling. The invention can also be carried into effect by combining it with the process of improving the colour of sulphate of ammonia described in patent No. 152,766. For instance, if the conical vessel described therein is fitted with a steam jacket, the paste of sulphate of ammonia and washing liquor remaining after floating-off the colour-giving impurities (and if desired, after decanting the supernatant liquor) may be drained in it according to the invention. The shape of the vessel is immaterial, provided it is capable of keeping the salt at a temperature at which the adhering mother liquor is prevented from further crystallization. The temperature should, however, not be raised substantially above the temperature of the crystals themselves, as this would lead to the formation of hard crusts. It is therefore usually sufficient to use steam of quite low pressure for heating the draining vessel; and if desired, the mixture of waste gases and steam coming from the saturator may be employed as heating agent.

The draining vessel should be preferably kept closed; and it must be understood that the purpose of the invention is draining, and not drying by the evaporation of water. In certain cases the application suction or pressure, in the manner usual with vacuum or pressure filters, may be found advisable so as to hasten the draining process.

In order to show the advantages of this new method over the known draining table, the following comparative results are quoted. A charge fished from a hand-worked saturator was divided into equal portions; one being placed on an ordinary draining table, the other into a steam-heated draining pan as described above. The steam pressure maintained in the jacket was 2 lbs. per sq. in. The paste was allowed to drain for four hours on the draining table, and only for one hour in the steam-heated pan. Samples were taken giving the following results:

	Draining Table.	Steam-Heated Pan.
Duration of Draining	4 hours.	1 hour.
Moisture	11·91 p.ct.	7·07 p.ct.
Free acid as H_2SO_4	0·85 ,,	0·31 ,,
Insoluble (ignited)	0·03 ,,	0·02 ,,
Iron as Fe_2O_3	0·10 ,,	0·04 ,,
Physical condition	pasty.	detached crystals.

The amount of impurities in sulphate of ammonia, and their nature, varies considerably in different works, and the above results, the patentee points out, must be looked upon as strictly comparative, and not as the best results obtainable by the invention.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for May 10.]

Nos. 12,103 to 12,880.

Alexander, A. E. (Wilputte).—"Collecting mains for bye-product coke-ovens." No. 12,165.

Allgemeine Ges für Chemische Industrie.—"Process for purifying hydrocarbons." No. 12,625.

Anderson, T. G.—"Coin-feed and coin-freed apparatus." No. 12,430.

Arnott, A. K. & G. A.—"Gas connections for flexible tubing." No. 12,695.

Beard, G. F. H.—"Catch for opening and closing doors of mouthpieces of gas-retorts, &c." No. 12,571.

Beilby, G. T.—"Carbonization of coal, shale, peat, &c." No. 12,288.

Blair, A.—See Blair, Campbell, and McLean, Ltd. No. 12,592.

Blair, Campbell, and McLean, Ltd.—"Apparatus for evaporating, distilling, heating, or cooling fluids." No. 12,592.

Bone, D.—"Thermostats for gas-heated hot-water circulators, &c." No. 12,594.

Breach, L.—"Igniting-means for gas-burners, &c." No. 12,825.

Coleman, A.—See Coleman and Sons, Ltd., T. No. 12,466.

Coleman and Sons, Ltd., T.—"Valve for tar, bitumen, &c., heaters and spraying-machines." No. 12,466.

Crossley, P.—"Gas-fittings." No. 12,421.

Dempster, Ltd., R. & J.—See Beard, G. F. H. No. 12,571.

Duckham, Sir A. M.—"Heat insulation." No. 12,392.

Edmead, F.—"Automatic safety gas-cock." No. 12,614.

Fox, J. T.—"Gas-recorder." No. 12,278.

Grylewicz, F.—"Gas-burners." No. 12,338-39.

Huntsworth, G. H.—See Anderson, T. G. No. 12,430.

Jaques, A.—"Manufacture of hydrogen or gases rich in hydrogen." No. 12,529.

Lea, F. M.—"Igniting means for gas-burners, &c." No. 12,825.

Nitrogen Corporation.—"Synthesis of ammonia." No. 12,196.

Parr, C. E.—See Grylewicz, F. Nos. 12,338-39.

Radium Glühkörper Fabrik Ges.—"Carrying device for incandescent mantle bodies." No. 12,647.

Razen, Schaffer, & Co.—"Vertical retort for distillation of schists, bituminous materials, brown coal, &c." No. 12,177.

Soc. de Fours à Coke et d'Entreprises Industrielles.—"Distillation of combustibles." No. 12,521.

Stimson, E. F.—See Bone, D. No. 12,594.

Thomas, J. W.—"Gas, &c., slot-meters." No. 12,600.

Thwaites, R. E.—"Vertical gas-retorts." No. 12,743.

Tully, C. B.—See Jaques, A. No. 12,529.

West, J. H.—See Jaques, A. No. 12,529.

Wilputte, L.—See Alexander, A. E. No. 12,165.

Woodall, Duckham, and Jones (1920), Ltd.—See Duckham, Sir A. M. No. 12,392.

The Turton Council recently made an application to the Bolton Corporation for a reduction in the price of gas. At the Council meeting, on the 4th inst., a letter was read from Bolton, intimating that the question had been considered by the Gas Committee; but the finances of the undertaking did not, at present, warrant any reduction being made. During the recent coal strike, the department sustained a loss of £30,000, which should be recouped before any reduction was made.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Birmingham Corporation Bill: The further Standing Orders have been complied with, and the Bill read a second time and committed.

Blackburn Corporation Bill: Reported, with amendments.

Ramsgate Corporation Bill: Reported, with amendments.

Sheffield Gas Bill: Read a second time, and committed.

A Select Committee, consisting of the Earl Fitzwilliam, Lord Fairfax, Lord Wemyss, Lord Lawrence, and Lord Wyfold, has been appointed to consider the Chester Gas Bill, and will meet to-day (Wednesday).

BLACKBURN CORPORATION BILL.

The Bill promoted by the Blackburn Corporation (see the "JOURNAL," Jan. 11, p. 80, and March 29, p. 768) came before the Unopposed Committee of the House of Lords on Tuesday of last week, and was ordered to be reported for third reading.

HOUSE OF COMMONS.

Progress of Bills.

Bolton Corporation Bill: Standing Orders not previously inquired into have been complied with.

Stoke-on-Trent Corporation (Gas Consolidation) Bill: Reported, with amendments.

Gas Regulation Act, 1920.

A copy was presented of a draft of a Special Order proposed to be made by the Board of Trade under section 10 of the Act on the application of the Felixstowe Gas Light Company.

Public Utility Companies (Capital Issues) Act, 1920.

Copies were presented of reports by the Board of Trade under the Act on applications by the East Grinstead Gas and Water Company, and the Frodsham Gas and Water Company.

GRAMPIAN ELECTRICITY SUPPLY (SUBSTITUTED) BILL.

This Bill has occupied during the past two weeks the attention of a Committee of the House of Commons under the chairmanship of Mr. ORMESBY-GORE. Its object is to incorporate a statutory company, to be called the Grampian Electricity Supply Company, and to empower the Company to construct works in the neighbourhood of the Grampians for the purpose of harnessing the very large amount of water power which is to-day running to waste, and by means of that power to work stations for generating electricity for domestic, industrial, and other purposes in a large area, including the City of Dundee. Although the scheme is to be worked by private enterprise, the promoters hope to have the advantage of a guarantee from the State.

The discussion before the Committee concerned a number of petitions presented by owners of property in the neighbourhood of the proposed scheme; but these matters have now been adjusted between the parties. The other petition presented was by the Lord Provost, Magistrates, and councillors of the City and Royal Burgh of Dundee, and the Dundee Gas Commissioners. The latter are the local authority for lighting, and object to the new Company's proposed area of supply embracing their own area, and to the Company's being given power to supply electricity within, or for use within, their area. The Gas Commissioners point out that the electricity generating station belonging to them in the City of Dundee has an excellent record for thermal efficiency, and is at the present time admitted to be one of the most efficient and economical stations in the Kingdom. Moreover, the price charged for electricity has always been reasonable, and there is a prospect, owing to the fall in the price of coal and to other facilities, of the price being reduced in the near future. In view of these facts, they submit that there is no reason why the Company should be empowered to interfere directly or indirectly with them. Objection was also taken, apart from the preamble, to various powers sought by the Company for the opening-up of roads and streets (the petitioners being responsible for the laying of mains, pipes, &c., in their area), the laying of pipes across and along highways and tramways, and to proposals with regard to the fixing of prices. They point out that, in the fixing of prices, provisions as to limitation, or the relation of price to dividend, and revision ought to be included, as well as provisions to prevent more favourable terms being given to one purchaser of electricity in bulk over another, and for relieving any other authorized distributors from liability in the event of their agreeing to take a supply from the Company and the Company's failing to provide it. They particularly object to the powers sought to be obtained with regard to notice of discontinuance of supply. These are that any authorized undertakers, company, body, or person supplied with electricity by the Company under this Act who desired that the Company shall cease to continue such supply shall give to the Company twelve months' notice in writing to do so. Such notice is not to be given so as to expire before the end of the period for which the authorized undertakers, company, body, or person giving the notice have contracted to receive and pay for such supply, or at any subsequent date. During the course of the proceedings all objections to the preamble of the Bill were withdrawn.

On Tuesday, May 9, the Committee met to approve the clauses which had been agreed between the promoters and the various petitioners, and the following new clause was included in the Bill:

"For the protection of the Lord Provost, Magistrates, and Councillors of the City and Royal Burgh of Dundee, and the Dundee Gas Commissioners (in this Section respectively called 'The Corporation,' 'The City,' and 'The Commissioners'), the following provisions shall, unless otherwise agreed between the Company and the Corporation and the Commissioners, apply and have effect:

"Notwithstanding anything contained in this Act, the powers of this Act shall not apply to, or be exercised or exercisable within, the city except with the consent of the Corporation and the Commissioners, save that the Company may supply outside the city electricity for use within the city for the purposes of traction on railways and lighting vehicles drawn by such traction."

It may be mentioned that, in announcing the Committee's decision to pass the preamble of the Bill, in view of the withdrawal of all objections to the preamble, the Chairman remarked that although the scheme which had been put forward was as good as was likely to be evolved for the area, the Committee did not think that the commercial prospects were very promising for a number of years. The question of the grant under the Trade Facilities Act was referred to by one member of the Committee, who wished to place on record his personal opinion that, in view of the Committee's ideas of the immediate commercial prospects of the scheme, it was not one that should have Government money invested in it. Moreover, he thought that such a grant might lead the public to invest in the scheme, so to speak, under false pretences.

STOKE-ON-TRENT CORPORATION (GAS CONSOLIDATION) BILL.

The Potteries Station—Declared Calorific Value and Price.

This Bill was considered by the Unopposed Committee of the House of Commons on Wednesday last. (A notice of the provisions of the Bill appeared in the "JOURNAL" for Jan. 18 last, p. 151, and the proceedings before the Unopposed Committee of the House of Lords were reported in the issue for March 8, p. 583.)

A number of alterations have been made to the transitory provisions affecting quality, testing, pressure, and price of gas. As originally lodged, these provisions divided the five gas undertakings into groups A and B; the former being the Longton, Stoke-on-Trent, Fenton, and Burslem undertakings, and the latter the Staffordshire Potteries undertaking, which the Corporation are acquiring from the British Gas Light Company, Ltd. It was provided, however, that this part of the Act should cease to be in force so soon as an Order in respect of the whole of the gas undertaking should have been made by the Board of Trade and become operative under section 1 of the Gas Regulation Act. The original provisions have now been struck out of the Bill; and the clause relating to the quality of gas over the whole undertaking now reads as follows:

> Subject as hereinafter provided, the gas supplied by the Corporation shall, when tested in accordance with the provisions of the Gas Regulation Act, 1920, be of a calorific value of not less than 470 B.Th.U., and such value, unless and until altered in accordance with the provisions of the next following section of this Act, and thereafter such altered value, or each of such altered values, if the Corporation so declare (as they are hereby empowered to do) a different calorific value of the gas to be supplied in any area or areas within the limits of this Act, shall, for the purposes of the Gas Regulation Act, 1920, be deemed to be, and is hereinafter referred to as, the declared calorific value.

The original clause dealing with variation of declared calorific value, which is the "next following section of this Act," has been struck out of the Bill, and the following substituted:

> If at any time the Corporation intend to alter the declared calorific value of the gas supplied by them, either throughout the limits of this Act or in any area or areas therein, they shall give notice of their intention to supply, either throughout such limits or in such area or areas therein as shall be specified in such notice, and as from a date to be therein specified, and being not less than three months from the date of such notice, gas of such calorific value as may be declared in the notice, and the calorific value so declared shall, as from the date so specified, be the declared calorific value for the purposes of this part of this Act and of the Gas Regulation Act, 1920, in respect of the area specified in the notice. Any notice given under this section shall be published by advertisement in the "London Gazette," and a copy thereof shall be sent to the Board of Trade and to each local authority (if any) other than the Corporation, and to every consumer within the area specified in the notice.

A new clause limiting the price of gas has been inserted, as follows:

> The price to be charged by the Corporation for gas supplied by them to persons who shall burn the same by meter
>
> (*a*) Within the borough or within so much, as is situate outside the borough, of the area which, immediately before the passing of this Act, formed the area for the supply of gas by the Company under the Acts of the Company, shall not at any time exceed 13d. per therm; or
>
> (*b*) Within the Parish of Caverswall, Forsbrock, Fulford, Barlaston, Trentham or Stone Rural, shall not at any time exceed 14·28d. per therm.
>
> Provided that if at any time it is shown to the satisfaction of the Board of Trade that the cost and charges of and incidental to the production and supply of gas by the Corporation have substantially altered from circumstances beyond the control of, or which could not reasonably have been avoided by, the Corporation, the Board may, if they think fit, on the application of the Corporation or of the local authority or of twenty consumers, by Order in

writing, signed by a Secretary or Assistant Secretary of the said Board, correspondingly revise the maximum price authorized by this Act.

A clause has also been inserted for the protection of the North Staffordshire Railway Company, to the effect that nothing in the Act shall affect the powers of the Company to rebuild, alter, widen, or repair the structure of any bridge over the railways or canals of the Company in, on, or under which any gas main, pipe, or work of the Corporation may be laid or attached, or impose on the Company any liability which was not by law imposed upon them prior to the commencement of the Act. If, by reason of subsidence, the Company find it necessary to carry out works for rebuilding, altering, or repairing bridges, which involve interference with a gas main, pipe, or work belonging to the Corporation, the Company shall give seven days' notice to the Corporation; and in the event of the Corporation not removing and relaying such main, pipe, or work, they shall pay to the Company the reasonable costs.

The preamble of the Bill was proved.

MISCELLANEOUS NEWS.

GAS REGULATION ACT ORDERS.

There have been received from the Director of Gas Administration copies of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

Basingstoke Gas Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 15·8d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by five.

Prepayment meter clauses are included. (May 9.)

Crediton Gas Company.

After the declared date: (1) The standard prices in respect of gas supplied by the undertakers shall be 18·6d. and 19·8d per therm; and these prices respectively shall be substituted for the prices of 4s. 6d. and 5s. per 1000 c.ft. mentioned in the first paragraph of section 53 (dividends dependent on price charged) of the Crediton Gas Act, 1906. (2) The price of 18 6d. per therm shall be substituted for the price of 4s. 6d. per 1000 c.ft. mentioned in the third proviso to section 53 of the Crediton Gas Act, 1906; and the said proviso shall be read and have effect as if the words "two pounds per ton" were substituted for the words "one pound per ton."

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by five.

After the declared date, the price of 18·6d. per therm shall be substituted for the price of 4s. 6d. per 1000 c.ft. mentioned in the proviso to section 35 (profits of company limited) of the Crediton Gas Act, 1906. (May 12.)

Fleetwood Gas Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 16·2d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by four-and-three-quarters.

Prepayment meter clauses are included. (May 5.)

Windsor Royal Gas Light Company.

As from the declared date, the maximum prices in respect of gas supplied by the undertakers shall be 18d. and 21·6d. per therm; and these prices respectively shall be substituted for the prices of 5s. 6d. and 7s. per 1000 c.ft. mentioned in section 45 (limiting the price of gas) of the Windsor Royal Gas Act, 1867. (May 12.)

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" with regard to applications to the Board of Trade for Orders under the Gas Regulation Act.

Hartlepool Gas and Water Company.

The maximum prices now authorized in respect of the supply of gas by the undertakers are 5s. and 6s. 8d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for these is 16·44d. per therm, with power to the undertakers, if they consider it necessary, to charge more per therm in the area having a present maximum price of 6s. 8d. than in the area having a present maximum price of 5s. per 1000 c.ft., provided always that the maximum price of 16·44d. per therm is not exceeded.

Lewes Gas Company.

The maximum prices now authorized in respect of the supply of gas by the undertakers are 6s. per 1000 c.ft. within the parliamentary boundaries of the extended borough of Lewes, as prescribed by section 55 of the Lewes Gas Act, 1878, and 7s. in other parts; and the prices they have asked the Board of Trade to substitute for these are 1s. 9·6d. and 2s. per therm respectively.

Newport Pagnell Gas and Coke Company, Ltd.

The maximum price now authorized in respect of the supply of gas by the undertakers is 4s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 6¼d. per therm.

SPECIAL ORDER.

Long Eaton Gas Company.

Application is to be made to the Board of Trade by the Long Eaton Gas Company for a Special Order under section 10 of the Act, to enable them to acquire the undertaking of the Draycott Gas Company, to use additional lands for gas-works purposes, to raise further capital, and to make provisions as to the supply of gas and the management of the affairs of the Company.

DECLARATIONS OF CALORIFIC POWER.

Barnet District Gas and Water Company.—475 B.Th.U. (June 17.)
Lichfield Gas Company.—450 B.Th.U. (July 1.)
Mynyddislwyn Urban District Council.—425 B.Th.U. and 475 B.Th.U. in scheduled areas. (July 1.)

GAS PROFITS AND RATE AID.

Nottingham System Attacked.

Considerations of far-reaching importance in relation to the general application of the principle of utilizing gas profits in relief of municipal burdens were brought under discussion at a meeting of the Nottingham City Council on Monday of last week. For many years the gas revenue has been freely drawn upon in Nottingham in alleviation of rates.

A proposal was brought forward at the last meeting by Alderman A. Turney, one of the labour representatives upon the Council, that, having regard to certain restrictions which he suggested were imposed by the Nottingham Corporation Gas Act of 1874, no profits in excess of £5000 should be allocated from the undertaking towards the relief of rates; but the seriousness of this suggestion was illustrated by the fact that, if adopted, it would entail an addition of 5d. in the pound to the district rate. It is now proposed again to absorb £30,000 from gas profits, as in each of the preceding five years. Alderman Turney's postulate was that these repeated drawings, in excess of the amount limited by the Act, constituted a breach of the law. He argued that municipal undertakings were not intended to make huge profits in relief of the rates, but to supply an efficient service at a minimum cost. In his view, it was utterly wrong to overcharge their own citizens in order that they might overcharge consumers in areas outside the municipal boundary. Why, he asked, should rich people who were fortunate enough to have electric lighting be supplied with their commodity at under cost, and the poor people who used gas have to make a profit to subsidize the more fortunate members of the community? Mr. Griffin, who seconded the resolution, argued that it was high time the Council returned to the principle of running municipal undertakings at cost price.

Alderman A. Ball (the Chairman of the Gas Committee), however, pertinently asked why the Corporation should run the undertaking at cost price for the benefit of outside consumers who contribute nothing towards the rates. It was far better that municipal rates should be kept to as low a point as possible, rather than that the main aim should be to secure cheaper gas; for it was by the former process that they might best hope to attract manufacturers to establish new industries in the city. It was in the interest of the ratepayers that £30,000, as proposed, should be taken from the profits. He added (amid laughter) that there would not be any profit upon the undertaking next year. It was estimated that the expenditure upon 183,868 tons of coal would be £91,934, wages and salaries £30,000, general materials £10,000, and rates £1000, making a total of £132,934; and, after deducting £34,000 for improved quality of gas, increased income-tax payable, and for possible over-estimation of gas this year, the figures would be £98,934. The income would be, however, £135,610, leaving a net reduced income of £36,676.

It was contended by Alderman Sir Bernard Wright that the 3s. 3d. fixed as the price of gas in 1874 would, on to-day's values, represent 7s. per 1000 c.ft. Therefore, whatever the legal position might be, the Corporation in their present policy might be said to be well within the moral intent of the Gas Act. The amount taken in relief of rates was really less than 2 p.ct. on the capital the citizens had raised.

Mr. H. Ford, another of the Labour representatives, while agreeing that the Nottingham gas undertaking was second to none in regard to the efficiency of its management, urged that under the present system of allocating profits, the big ratepayer who used electricity for lighting, heating, and cooking purposes, gained far more than the man who lived in a small house.

Mr. Gover Ford (the Vice-Chairman of the Gas Committee, who had previously as Chairman of the Finance Committee introduced the annual budget) submitted a calculation to show that, whereas a gas consumer who lived in a working-class house assessed at £12 would have 3s. 6d. per annum if all the surplus profits were used for reduction in the price of gas instead of the rates, the same man would save 4s. 6d. by the present policy. The City gas undertaking was acknowledged outside Nottingham to be one of the finest in the country.

The amendment by which it was proposed to limit to £5000 the amount to be taken from the gas profits in aid of the rates, was rejected by 36 to 13 votes.

Newry Gas-Works and Recognition.—The Newry Urban Council having refused to recognize the Northern Ireland Government, the latter issued an order of dissolution; and the affairs of the municipal area are now being administered by a Special Committee appointed for the purpose. The gas-works, of course, are included; but the Gas Committee have withheld recognition, with the result that an awkward crisis has arisen. When a meeting of the Committee was called to transact the usual business, members were refused admittance to the Town Hall by the police, who had been in possession since the dissolution. Officials met with like treatment. An adjournment was then made to the gas-works offices, where it is understood some business was transacted.

BOMBAY GAS COMPANY, LTD.

The Ordinary General Meeting of the Company was held last Thursday, at the London Offices, Moorgate Station Chambers, E.C.—Mr. H. E. JONES in the chair.

The SECRETARY (Mr. A. Dickson, jun.) read the notice calling the meeting and the report of the Auditors; and the Directors' report and the accounts were taken as read.

THE RISE IN STOCK VALUE.

The CHAIRMAN, in moving the adoption of the Directors' report and the accounts, said that, coming along in the train that morning and looking at the financial columns of "The Times," he could not help thinking how the shareholders must congratulate themselves on seeing the way in which the stock of this Company had gone up within the last few months—indeed, he might almost say within the last few weeks. They would, in fact, if they were general gas shareholders—as it was his, he would not say misfortune, for he thought it was good luck, to be—have observed that all gas stocks had been going up. This was really the effect of the war conditions having passed away. The labour market was less disturbed; and the coal market showed healthy signs—in England, at any rate—of going down.

AN UNUSUAL EXPERIENCE.

He had in bygone years—prematurely, as it turned out—congratulated India upon being a country that was happy in having no history that could be compared with the European turmoil; but he could not possibly foresee that in India there would be a gentleman named Ghandi, and that events would take the turn they had done. However, as the shareholders knew, the Company had had a very serious strike at their Bombay works, which they had thought an almost impossible thing to happen, because the people there were an extremely contented class. In fact, it was their very contentment, he thought, which had given rise to the trouble. England wants every man to do as he likes; and, as Sir Frederick Bramwell once said: "If he does not do as he likes, we pass a law to make him." They had been trying, he was afraid, to do the same thing in India; but happily all this had now passed over, and the strike had become a matter of history. There was just one thing about it which he did not think there was any reason he should not tell them. On the very day on which, on one side of Bombay, the people were fêting and applauding our Royal Prince, and treating him with the greatest cordiality and hospitality, on the other side of the city, where the gas-works were, they were engaged in breaking the head of the Manager (Mr. A. R. Burch), who had to go to the hospital for treatment. There was an English proverb which said: "Let well alone." They thought they were going to be left alone in India; but they were not. This, however, was by the way.

A LARGE INCREASE IN BUSINESS.

Coming now to the business of the Company, he might say that the increase in the sale of gas in the year under review had amounted to as much as 13·9 p.ct.—just under 14 p.ct. This was about double the increase if averaged over a period of (say) ten years; and the figure was a particularly significant one when they came to look at the capital that had been spent, because this stood at a very modest amount. It was more modest, indeed, than it ought to be, because, of course, during the war period it had been quite impossible to procure material for capital purposes except at such rates as, had they been so indiscreet as to procure them, would have made the position worse for the future. It would be seen from the report that the dividend recommended by the Directors was maintained at 8 p.ct., of which the first half had been paid as an interim dividend. It would be seen also that there had been some small expenditure on capital account during the past year. On new and additional mains there had been expended £5215, which was rather less than the outlay under this head in 1920. New buildings had cost £434 (which was a good deal less than a year ago, when the figure was £6045) for the erection of the residential quarters for the European staff. The expenditure on new and additional meters, at £1194, was just about £1000 less. Thus altogether the addition to the capital account made during 1921 had been £6844, which represented slightly over 2 p.ct. upon the total capital.

THE FINANCIAL POSITION.

If they would bear in mind that this 2 p.ct. was associated with an increase in the sale of gas of 13·9 p.ct., it would be at once admitted that so far the Board had committed no financial blunders; but they would have to get to work and find some more capital before long, because they could not control a business developing at the rate that Bombay looked like developing to-day—and as it did develop last year—without an expenditure of money. The Company had very long-suffering and tolerant bankers, who had helped them greatly; but they could not go on indefinitely in this way, and so would have to raise money presently. Very considerable extensions of mains would be necessary in Bombay, because of the great developments that were taking place in connection with providing housing accommodation for the population, in the district which lay to the west of the northernmost part of Bombay City. This would no doubt bring a very large addition to the duties and responsibilities of the Company. He had been told by private friends having to do with that city that Bombay was likely to boom. He himself did not quite understand this; but the Deputy-Chairman would no doubt be able to tell them more of it, because he knew all about the various markets, and how they operated. But it did seem likely that India was going to manufacture more and develop more.

POINTS FROM THE ACCOUNTS.

With regard to the general working and the accounts, he had just lately had a letter from one of the shareholders which raised some points to which he might take this opportunity of replying. The increase in the cost of coal, which had been about 6s. per ton, was an increase which had followed the growth of trade in India, and had to a certain extent been affected by disturbed labour conditions on the railways and in the mines. These disturbed conditions had now passed off; but for the time being they prevented coals coming along as cheaply or as expeditiously as before. There was an increase in the charge for rent, rates, and taxes of £2703, which was accounted for simply by the rise in income-tax. Then the writer went on to ask about the rise in the exchange. It would be easily understood that the Directors had nothing whatever to do in the way of controlling the rate of exchange; but it had had one extraordinary effect. If the exchange had been added in 1920, as he thought it might have been, being a fluctuating amount, to the cost of the revenue account, the profit would have been £23,628 as against £26,763 this year. This will explain why they were left at the end of the year, after allowing for the increase in the interest account and the sums placed to the reserve funds, with only a *plus* of £111 in the balance available, which was now £37,024, as against £36,913 a year ago. With regard to the operations of the Company, he was glad to be able to tell the shareholders that the results were satisfactory. The various figures and details were carefully scrutinized by the Board—and especially by Mr. Louis Penny, who was unfortunately absent from that meeting on account of a temporary illness, but who when with them was a most conscientious and careful watchdog of the shareholders' interests, and possessed the advantage of an intimate knowledge of Bombay, where he had resided for some years. The works were in excellent order. The retorts were in very good condition; and the make of gas per ton of coal, and other technical details, were quite equal to the best that were to be found in this country. Coke, which was always a fluctuating element and varied very much in the case of English undertakings, in Bombay maintained its value and its demand; and the manager would no doubt prefer to sell it, rather than to convert it into gas. He did not know that he could add anything more to the information he had given; and upon these facts, and with the satisfactory dividend of 8 p.ct., and the other favourable factors to which he had drawn attention, he begged to move that the report of the directors and the statement of accounts for the year ended Dec. 31, 1921, be received and adopted.

The DEPUTY-CHAIRMAN (Mr. W. G. Bradshaw, C.B.E.) formally seconded the motion.

DISPOSAL OF GAS LIQUOR.

Mr. A. J. KINGDON said that in last year's accounts there was an item for gas liquor, which did not appear on the present occasion; and he asked how this came about.

The CHAIRMAN remarked that the question of gas liquor was just the one thing which, ever since he had been connected with the Company—it was very ancient history now—had been on his mind. To utilize gas liquor properly they must procure sulphuric acid, by the aid of which they obtained the ammonia in the form of a salt very valuable for fertilizing—so valuable, indeed, that personally he would feel inclined at any risk to put up a plant for making the sulphuric acid. The difficulty with them was the smallness of the scale of operations. This process in a gas-works constituted a most interesting cycle. The gas contained as an impurity the very sulphur which arrested another impurity from the gas, the ammonia, and turned it into this very valuable salt, the price of which was to-day some £16 or £17 per ton. He would be fortified by the question that had been asked in proposing to his colleagues the rather heroic course of seizing this sulphur which was at present being wasted, and seizing the ammonia which now was more or less wasted. They had had a contractor who bought the liquor at a price which was absolutely inconsiderable. It was hardly worth having, except that the contractor relieved them of the difficulty of disposing of the liquor. He had come to grief, and they could, perhaps, do for themselves better than he could do for them. It was a point that would not be lost sight of; and he thought that, developing as the business was, they might feel justified in incurring expenditure on a sulphuric acid plant, &c., about which hitherto they had rather hesitated.

The resolution was then carried unanimously.

THE DIVIDEND AND RE-ELECTIONS.

The CHAIRMAN next proposed—"That a final dividend for the year ended Dec. 31, 1921, of 4 p.ct. (less income-tax at the rate of 3s. 8·13d. in the pound) be now declared payable on and after the 25th inst., making, with the interim dividend of 4 p.ct., a dividend of 8 p.ct. for the year."

This was seconded by the DEPUTY-CHAIRMAN, and agreed to.

The DEPUTY-CHAIRMAN said he had the greatest confidence that the resolution he had now to propose would meet with the hearty approval of everyone present. It was that the retiring Directors (Mr. H. E. Jones and Mr. Louis Penny) be re-elected. They were well-aware of the great value of their Chairman to the Bombay Gas Company; and they would have in mind the fact that he was not only a Past-President of the Institution of Civil Engineers (the highest honour which could come to an English engineer), but that he was also a Past-President of the Institution of Gas Engineers (the highest honour which could come to a gas engineer). He had a reputation in this country which stood as high as, if not higher than, that of any other man; and any Company which had him at the head of it rightly commanded the confidence of the investing public. Mr. Penny had been connected with the Company for between forty and fifty years. He took the very greatest interest in its welfare, and was only prevented from being with them that day by reason of a disease which he contracted when he was the Company's Engineer in Bombay many years ago.

Mr. CHARLES HUNT seconded the proposition, which was heartily passed.

On the motion of Mr. F. R. SMITH, the Auditors (Mr. S. G. Browne and Mr. A. Morland, F.C.A.) were re-appointed.

QUESTION OF NEW CAPITAL.

Mr. J. H. MACKAY said the Chairman had intimated that they would be coming to the shareholders with regard to an increase in the capital of the Company. Did the Board propose to issue further shares or debentures? And was the issue to be immediate or deferred?

The CHAIRMAN replied that this was precisely the point he had omitted to make in his speech. The Directors were constantly in touch with those who could advise them best upon this question of raising capital. If they had raised it two years ago, it would have

cost them he hardly liked to say what. For English companies it was costing 7 to 7½ p.ct. on redeemable debentures; and probably they would have had to pay about 9 p.ct. in those times. Whether they would issue preference stock or debenture stock, was a point they would have carefully to consider. The Board would do their best. But his advice to the shareholders was that whenever there was any stock in the Company available on the market—whether it was ordinary, preference, or debenture—they should secure it. Their shares, which a few months ago were £3, had now gone up to £4 15s. He would not let it go by. It was the duty of gas shareholders generally, having gone through the rough times of the last few years—which had not affected their Company as much as others—and with now expanding business and cheaper production before the industry, to see that they did not allow outsiders to come in and get stock which would rank as against existing shareholders in the future. It was a sound industry. He ought to know something about it, as he had been sixty years connected with gas (he went into it when he was about sixteen); and he had more confidence in it than he had ever had in his life. He was afraid he had not given the shareholder a very specific answer to his question; but the Board would select what would be the lightest burden for the Company to undertake.

Mr. MACKAY: Can you indicate to what extent you will require additional capital? At the last meeting you rather challenged the shareholders to come forward, if they had any loose cash, and offer it to the Company.

The CHAIRMAN replied that the Board would be only too glad to hear from shareholders on the subject of mortgages. As to the amount of money that would be required, it was obvious that they must be governed by the expenditure, which would be recurrent. They did not want to spend a specific amount in any one year. Probably the plan adopted would be to pile-up a little debt with the bank, and then pay it off.

Mr. ASCHWANDEN said it would appear from the accounts that they had only a further £20,000 to raise without an alteration in the Articles of Association.

The DEPUTY-CHAIRMAN: The Directors have power under the Articles to borrow; but we should have to come to the shareholders to create more capital.

VOTES OF THANKS.

The CHAIRMAN said he would like to ask the shareholders to recognize the efforts of their servants both in England and India. In Bombay, with the strike, they had gone through an extremely anxious period. For the first time in the history of the Company, they found their labourers assuming an attitude of non-co-operation, and refusing to work. This gave rise to a good deal of trouble; and the work had to be carried on for some time chiefly by Europeans, with the aid of a few of the more loyal and experienced natives. Things were, indeed, so bad at one time that the lamplighters who tried to do their work were severely assaulted by the discontented population—not altogether their own colleagues, but evidently agitators from outside. This, of course, entitled all the men who stuck to the Company, from the humblest to Mr. Burch at the head, to recognition of their services by the Directors and shareholders. Therefore he hoped they would show, by their approval of the vote, their sense of obligation to them. In a less anxious and worrying degree, but with very great efficiency, the Secretary and his assistants here had carried out their work; and the thanks of the shareholders were due to them also. They possessed one or two quite exceptional accountants; and the work in the office was done on model lines. Within a few days of getting particulars over from Bombay, they were tabulated and posted to the members of the Board with a completeness that was most creditable, and showed that the staff had the best interests of the Company at heart. He begged, therefore, to move a very hearty vote of thanks to the officers and employees, both abroad and at home, for their services during the past year.

The DEPUTY-CHAIRMAN seconded the proposition, which was heartily passed.

The SECRETARY said he would like to thank the Chairman for his very kind words in putting the vote—more especially on behalf of those who had borne the burden and brunt of the fight in Bombay. It would afford him much pleasure to communicate this vote to his colleagues on the other side, because he knew they regarded such expressions with very great satisfaction.

Mr. ASCHWANDEN proposed a vote of thanks to the Chairman and his colleagues on the Board for the very able manner in which the business had been conducted, and to the Chairman particularly for the way in which he had expounded the accounts, and for telling them about what it would probably be necessary to do financially in the future.

Mr. W. RICHARDS seconded the vote, which was cordially passed.

The CHAIRMAN said the Directors much appreciated the vote. They felt that to be entrusted with the important duty of the supply of light, heat, and power in Bombay—one of the first cities outside England of the great British Empire—was in itself a distinction; and when they enjoyed this distinction coupled with the knowledge that they had the shareholders' confidence, co-operation, and thanks, they were indeed very pleased.

Monte Video Gas and Dry Dock Company, Ltd.—The accounts for the year ended Dec. 31 will be submitted at the meeting next Wednesday, when the Directors will report that, after providing for interest on debenture stock and other charges, and including £20,275 brought forward from the previous year, the balance at the credit of profit and loss available for dividend is £35,687. An interim dividend of 2 p.ct. (free of income-tax) was paid on Dec. 1, 1921, in respect of the half year ended June 30: and the Board now recommend the payment on June 1 of a further dividend of 2 p.ct. (free of income-tax), making together a dividend of 4 p.ct. for the year, carrying forward a balance of £14,010. The balance at the credit of reserve account remains at £52,500, the deferred maintenance account at £15,000, and the contingency account at £17,739. Compared with the previous year, the total gas sales show an increase of 13·89 p.ct.

THE YEAR'S WORKING AT PADIHAM.

A Reduction in Price.

The annual statement with regard to the gas undertaking was submitted at the last monthly meeting of the Padiham Urban District Council, by Mr. Wiggins, the Chairman of the Gas Committee.

It was stated by Mr. Wiggins that the Gas Committee were following out the policy adopted recently of selling gas at a price that it cost to produce, but keeping in reserve sufficient from time to time to meet renewals and repairs. In reducing the price 8d. per 1000 c.ft. for Padiham, they considered they would have a safe margin to meet emergencies. The reduction might have been 9d.; but the Committee were of opinion that it would be safer to make it 8d. It was estimated last year that they would have a loss of about £20 on the year's working. In view of the difficulties existing last year in the coalfields, it was estimated that they would need to put £1500 to reserve, which was done. Instead of a deficit of £20, they had come out on the right side with about £50 in hand. Coal cost £2600 more than was estimated, £900 of which was due to the coal strike, and the remainder to increased consumption of coal. The £900 extra through the strike was a small figure compared with what it cost many other authorities, and Padiham came out of that very well. The total amount by which the estimated expenditure was exceeded was £3929. Against this they had increases over the estimated income of £2500 for gas and £1200 for coke. They kept up a continuous supply of gas during the coal dispute. Owing to foresight in accumulating large stocks of coal, the financial loss was comparatively small; and it was not found necessary to increase the price of gas after the strike, as was the case with a great many undertakings. The gas consumption still continued to increase steadily. The quantity sold during the year was 6,000,000 c.ft. more than in the previous year, equal to 6·18 p.ct. Based on its heating value, the price of gas to Padiham consumers was now 10d. per therm. The figure was now 4s. 4d. per 1000 c.ft. less 5 p.ct., and the other usual allowances to large users. Dealing with the £1506 which was placed to reserve last year, he said it was proposed to spend as much of that as it was thought desirable in the coming year in putting in new mains where the service was insufficient. There were many old pipes in the town which needed replacing; for, besides being old, they were too small for their purpose since the advent of the gas-cooker. It was the aim of the Committee to raise the consumption of gas as much as possible. If they succeeded in increasing it by 7 p.ct., it would enable them to put in a new holder without increasing the standing capital charges on the undertaking. This should be done during the coming year with the expected revival of trade.

CITY AND GUILDS OF LONDON EXAMINATION PAPERS.

GAS SUPPLY.

The following questions were put by the Examiner, Mr. H. Kendrick, of Stretford, to candidates in the examinations in Gas Supply, which were held last Saturday. The maximum number of marks obtainable is appended to the different questions. Not more than eight questions to be attempted.

GRADE I.

1. Under what conditions is it necessary to protect gas-pipes when laid in the ground? State what measures should be taken to protect cast-iron pipes, steel mains, and wrought-iron service pipes from external corrosion. (40 marks.)

2. Describe, with sketches of connections and plant, the operation of inserting a 6 in. branch in a 12-in. main, so as not to interfere with the supply of gas to the surrounding area. (35.)

3. Describe, with sketches of apparatus, a method of testing for soundness the interior piping of a large dwelling-house. (35.)

4. How may gas be used to assist ventilation? State briefly the principles governing your answer. (30.)

5. Sketch a "Bray" special burner for low-quality gas, an argand burner, and a vertical inverted incandescent burner with protector to prevent discoloration of fittings. What candle power can be developed when the foregoing are each consuming 5 c.ft. per hour of 475 B.Th U. gas? (30.)

6. What effect has the tint of gas globes and interior decorations of a room on the distribution of light given out by incandescent gas-burners? Place the following colours of globes in order of their effect: Red, clear, pale green, opalescent, opal, lemon, and pink; and state approximately the absorption or increase of light when used as reflectors and as shades. (35.)

7. Sketch, in vertical section, a suspension bracket and three-burner wind-proof inverted outside lamp, attached to fascia board of a shop window front, showing method of fixing, and supplied with gas from the interior gas piping. (30.)

8. Make a sectional sketch of a gas-fire that is claimed to assist ventilation. Describe the method of fixing same to a modern slow combustion coal grate. State size of gas supply pipe for a fire with twelve radiants when the nearest pipe of sufficient size to ensure good results is 25 ft. away. (30.)

9. What are the principal uses of gas in industry? Sketch in section and describe one furnace with which you are familiar. (40.)

10. Make a rough sketch of an "Otto" type gas-engine, showing all connections and necessary accessories between the engine and the meter, tanks, and exhaust pipes. (35.)

11. Sketch and describe an 18-in. balance or compensating station governor. What advantages has this type over the older patterns? (35.)

FINAL GRADE.

1. What are the causes of internal corrosion in service pipes and cast-iron mains? What effect have the seasonal changes in atmospheric temperature on the corrosion when it does occur? State in

detail how you would deal with a partial and a total stoppage in both mains and services to give quick relief and a full supply of gas. (40.)

2. What diameters of pipes, each 2000 yds. in length, are required to discharge 25,000 c.ft. and 70,000 c.ft. per hour respectively? Specific gravity of gas being 0·5, the initial pressure 4 in., and the final pressure 3 in. water-gauge. (30.)

3. It is generally assumed that the principal cause of damage to gas-mains by electrolysis is by leakage of electric currents from tramway rails. How does this occur? What are the principal Board of Trade regulations under which tramway authorities have to work in order to minimize damage to gas-mains. (35.)

4. In a gas undertaking's area the supply is two-thirds domestic and one-third industrial, and the trunk mains are only large enough for the average supply. How will the pressure at the station governor have to be varied to meet the demand for gas throughout the 24 hours? Sketch a 24-hour station governor record showing the various alterations you will probably have to make to maintain an even pressure in a township about two miles distant from the gas-works, and state the reasons for each variation.

5. Sketch and describe a "Selas" or similar type compressor for gas and air. What advantages are claimed for these systems over low and high pressure gas and gas-and-air blast systems for lighting and industrial uses? (35.)

6. What are the principal troubles with dry and wet meters? Are they due to physical causes or chemical action? Is it possible to eradicate the source of the mischief economically? Explain fully your proposals. (40.)

7. Sketch and describe a gas-heated incubator and brooder house for a small poultry farm. State cost of gas supply and fittings to same when main gas supply is 60 yds. away. (35.)

8. Sketch and describe a gas-heated twin-chambered hardening furnace for preheating and hardening high-speed cutters, tools, &c. Give a detailed description of lighting-up, heating, and working the furnace, and state the average cost for fuel per lb. of tools dealt with when working on small and large tools. (35.)

9. What do you understand by hemispherical candle-power? Sketch diagram showing the candle-power obtainable from a No. 3 inverted gas-burner when fitted with and without a half opal globe reflector. (30.)

10. What is a foot candle and a lumen? What is the average illumination in foot candles found desirable for the following: Library reading room, general offices, sitting room (general), factory (general and bench), main streets, churches, and shop windows? (35.)

11. What is a unit of heat? What is meant when a gas is described as having a C.V. of 450 B.Th.U.? What is meant by net and gross C.V.? In calculating the heating effect of gas used for motive power, cooking, and water heating, would you use the net or gross figures? State your reasons. (30.)

GAS FITTING (Practical).

On p. 336 of last week's issue, we gave the questions set by Mr. R. J. Rogers, of Birmingham, in the recent written examinations in Gas Fitting; and these are now followed by the questions put by him in the practical examinations on the same subject. The time allowed for each exercise and, in the case of the Final, the maximum number of marks attainable are given after each question. All the questions set had to be attempted.

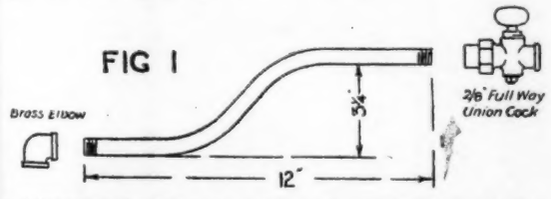
GRADE II.

The following materials to be supplied to each candidate for Tests 1 and 2: One ¾-in. main tap and union, one 5-lt. meter union, 1½ ft. of ¾-in. lead or compo. pipe, 1½ ft. of ½-in. copper pipe, one ½-in. gas-fire cock, one ½-in. female brass elbow.

1. Prepare a ¾-in. lead or compo connection from service pipe to 5-lt. dry meter. The service pipe is on a horizontal plane, and the meter inlet is to be 4 in. above the level of service pipe. (1 hour.)

2. With the ½-in. copper pipe supplied, make a double set to the dimensions shown in fig. 1. Screw one end for ½-in. brass thread and fit on the elbow; screw the other end for ½-in. gas thread and fit on the gas fire cock. (½ hour.)

FIG 1



3. Disconnect the float or tap rail from the cooking-stove, see that all taps are in working order, reconnect rail, and leave burners adjusted to give best results. (¾ hour.)

4. Examine the geyser and explain its construction and working. State the size of gas supply required, and explain how you would fix a flue from the geyser in the absence of a chimney flue in the bathroom. (½ hour.)

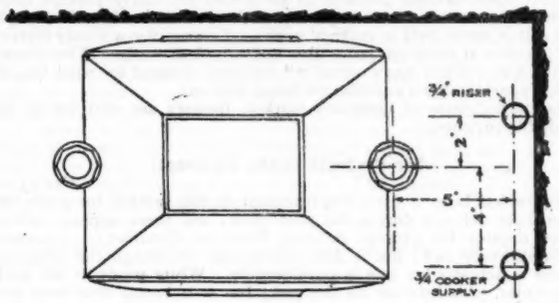
5. Fix the following burners: (*a*) Upright incandescent burner (economy type); (*b*) medium inverted burner; (*c*) small incandescent burner. Describe the usual positions where you would fix each type, and state the approximate consumption and candle power of each burner. (½ hour.)

6. Describe the construction and working of the 5-lt. dry automatic meter, and explain how you would connect the outlet pipe to prevent condensed water entering the meter. (½ hour.)

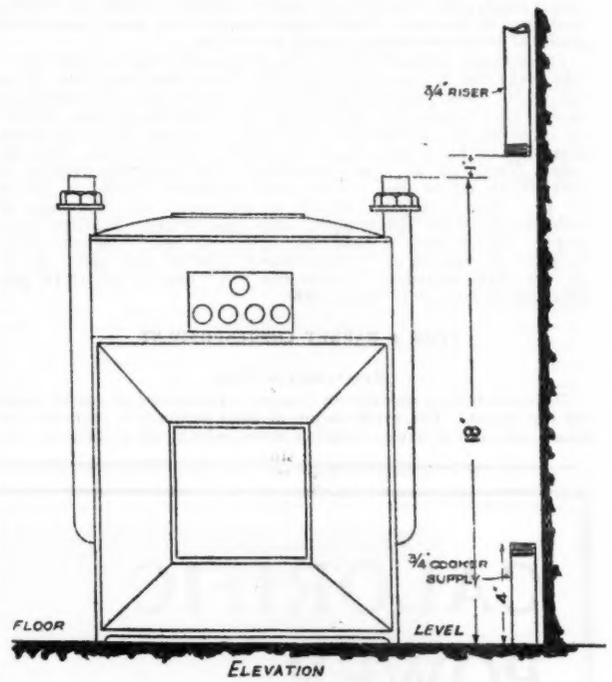
FINAL.

The following materials to be supplied to each candidate for Tests 1 and 6: 2½ ft. of 1-in. lead or compo. pipe, 1 ft. of ¾-in. lead or compo. pipe, two ¾-in. U joints, one 10-lt. meter union, 5 ft. of ¾-in. iron barrel (pipe).

1. Prepare and fix 1-in. lead or compo. pipe outlet meter connections for a 10-lt. dry meter, and insert on the outlet connection a ¾-in. branch pipe to house supply. The position of the meter and outlet pipes are shown. (1½ hours; 25 marks.)



PLAN



ELEVATION

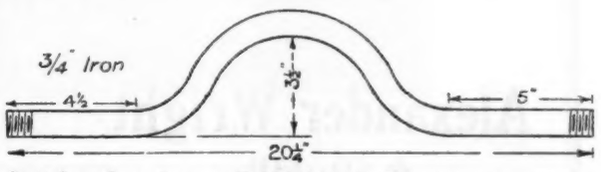
2. Take to pieces the gas-fire as you would do in the course of cleaning and adjusting it on a consumer's premises. Enumerate the various parts, re-assemble the fire, and adjust the burner to give the best heating result. State the consumption of gas per hour of the burner after you have adjusted it. (½ hour; 25 marks.)

3. Examine the gas-cooker and state if all the burners are properly adjusted. Explain the circumstances in which you would fix a flue-pipe to the oven and what precautions you would take to ensure satisfactory working if the flue-pipe were run to the outside of the building. (½ hour; 25 marks.)

4. Examine the 5-lt. dry meter. Explain the working of the meter and name the various parts, pointing out the more common defects from which the meter is liable to fail. State the precautions to be observed in fixing the meter to ensure the best results in registration and life of the meter. (½ hour; 25 marks.)

5. Take to pieces the inverted lamp. Explain the names and functions of its various parts, re-assemble and fix the lamp to the gas supply, adjusting the burner to give the best result. State the consumption and candle power of the lamp. (½ hour; 25 marks.)

6. Make a crank set on the ¾-in. pipe supplied to the dimensions shown in the sketch below. (¾ hour; 25 marks.)



In each grade a *viva voce* examination on other matters connected with the subject was conducted while the practical work was in progress.

Stealing from a Slot-Meter.—At the Birmingham Quarter Sessions last Wednesday week, William Joseph Green, aged 17, pleaded guilty to stealing 1s. 10d. belonging to his father. The money was taken from a slot-meter which was broken open. He was sent for Borstal treatment for a period not exceeding three years.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *May* 15.

In the London tar products market during the past week there has been rather more inquiry for pitch, and it would appear that there is still some further business to be placed for fairly prompt shipment. Creosote is also in request, and the price is steady at 6d. to 6¼d. per gallon net in bulk at makers' works. There is also a steady market for pyridine at about 6s. per gallon net in bulk at works. The advent of the fine weather has created a very good demand for road tar, of which considerable quantities are being sent out.

In the sulphate of ammonia market, farmers are still taking up available supplies.

Tar Products in the Provinces.

May 15.

There has been a little improvement in the market for pitch for immediate delivery during the past week; and there appears rather more inquiry for prompt delivery from the Continent. Creosote oil is still very dull; but it does not appear as though the quantity which is actually for sale is considerable. White products are still very quiet, with little or no demand; but it is hoped that with the warm weather a considerable improvement will take place in the demand for benzole, which should also improve naphtha. Carbolic acid is steady, and there are now inquiries from Germany for delivery to the end of the year. Naphthalene remains very quiet; while both grades of anthracene are at present unsaleable.

The average values for gas-works products during last week were: Gas-works coal tar, 30s. 6d. to 35s. 6d. Pitch, East Coast, 62s. 6d. to 65s. f.o.b. West Coast—Manchester, 60s. to 62s. 6d.; Liverpool, 60s. to 62s. 6d.; Clyde, 61s. 6d. to 63s. 6d. Benzole 90 p.ct. North, 2s. 1d. to 2s. 2d.; crude 65 p.ct. at 120° C., 1s. 5d. to 1s. 7d. naked at makers' works; 50-90 p.ct., naked, North, 2s. 1d. to 2s. 2d. Toluole, naked, North, 2s. 2d. to 2s. 5d. nominal. Coal tar crude naphtha in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 2s. 2d. to 2s. 4d. Heavy naphtha, North, 2s. 1d. to 2s. 3d. Creosote, in bulk, North, liquid, 4¼d. to 4½d.; salty, 3⅞d. to 4⅛d. Scotland, 3⅞d. to 4d. Heavy oils, in bulk, North, 6d. to 6¼d. Carbolic acid, 60 p.ct., 1s. 10d. to 2s. Naphthalene, £12 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 5d. to 6d. per minimum 40 p.ct.; "B" unsaleable.

FROM A MARKET CORRESPONDENT.

Bye-Products Trade.

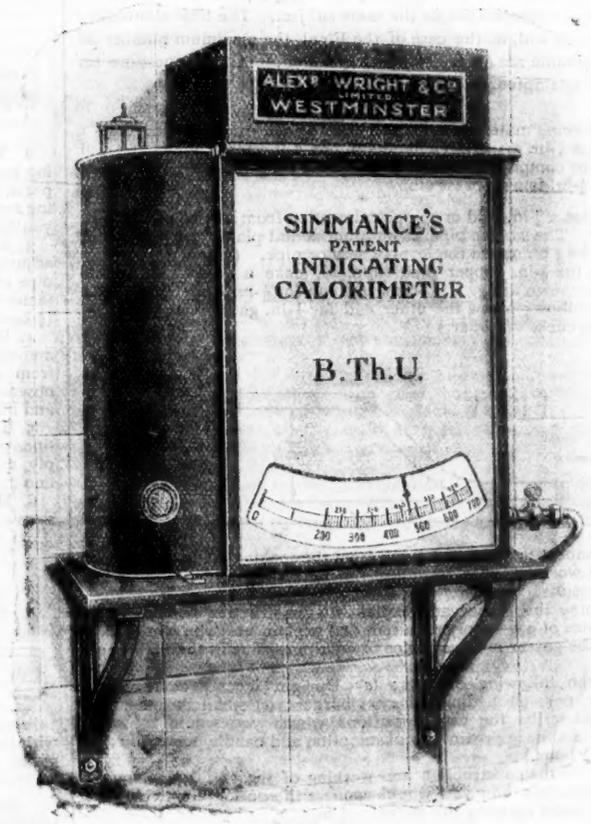
There has been practically no change in conditions or prices since the last report. The small output of most products is probably the reason why prices have not fallen away, which, on account of the small demand, they otherwise would have done. Curiously enough, there have been some good inquiries for carbolic acid, and crude 60's is in the neighbourhood of 1s. 10d. to 1s. 10½d. per gallon. Crystal carbolic is firmer; and some sellers are now talking of 6d. per lb. These prices they should readily obtain if they have to pay 1s. 10d. per gallon for crude. At the same time, it is worth noting that makers of crude think they ought to have 2s. per gallon if they are to get any profit. Pitch is a quiet market without much business. Prices remain at 60s. to 72s. 6d. according to district. The expected road-making demand does not appear to have come along yet. Solvent naphtha has been an easy market, with sellers in the neighbourhood of 2s. 3d. per gallon. There is practically no demand from the rubber trade, which industry seems to be worse off than is usually supposed. Creosote is steady. Cresylic acid is quiet at 2s. 1d. for pale 97/99, and 1s. 11d. for dark 95/97. Naphthalenes are in poor demand. Crudes are worth £5 to £7 per ton, and refined from £15 to £16 per ton. There has been a much more interesting session in intermediate products, and fair inquiries are coming to hand both on home and foreign account. At the same time there are no price changes to be noted.

Sulphate of Ammonia.

There is no change in the position of this material; the season of its consumption having now come to an end. Prices will shortly be announced for the early portion of next season. It is anticipated that some advance will be seen, particularly as it is hardly possible for the production to be increased at any rate to any great extent this year. There has been a larger demand from the home market; and with reduced production the effect upon our export trade is receiving the attention of our competitors.

Question of Making Coal Contracts.—The question of the gas coal contracts came up at a meeting of the Biddulph Urban Council last week, when Mr. Dale asked why it should be left in the hands of the Clerk and the Gas Manager to make the contracts. He had been told that the Council were in the hands of their officials; and he did not see why they should not do this work themselves. Mr. Dart (the Deputy-Clerk) said that, if this course was taken, it would be a relief to him. He had done his best in arranging the contracts to help to make the gas-works pay; and he believed he had saved the Council many hundreds of pounds. Mr. Scott held that the Gas Manager and the Clerk were two of the best men for the work; and Mr. Findlow (the Chairman of the Gas Committee) also said that in his opinion one or two persons could do really better than the whole Council, judging by their past experience. Mr. Hancock moved that the Clerk and the Gas Manager, with the Chairmen of the Finance and Gas Committees, have power to make the coal contracts; and this was carried.

CALORIFIC POWER AT A GLANCE.



Alexander Wright
& CO., LTD.,
WESTMINSTER, S.W. 1.
SOLE LICENSEES.

Charge to Large Consumers at Blackburn.—The Blackburn Town Council have agreed to a recommendation by the Gas Committee of the following scale for gas supplied for industrial purposes: Not exceeding 100,000 c.ft. per quarter, 4s. 4d. per 1000 c.ft.; between 100,000 and 500,000 c.ft., 4s.; between 500,000 and 1,000,000 c.ft., 3s. 9d.; exceeding 1,000,000 c.ft., 3s. 6d.—all subject to the usual discount of 2½ p.ct.

Aberystwyth Gas Price.—It was reported at a meeting of the Aberystwyth Town Council last week that a letter had been received from the Board of Trade stating that they had made an Order fixing a new standard price of 1s. 6d. per therm in respect of gas supplied by the Company. Captain E. Llewellyn announces that, notwithstanding this new standard price, the Directors had decided to charge only 1s. 2d. per therm. This was equal to 4s. 11½d. per 1000 c.ft.; and as the present price was 5s. 10d., they were making a reduction of 10½d. per 1000 c.ft. He said it was not true that the Directors had discussed the question of increasing the rent of gas-stoves.

Birmingham Gas Committee's Surplus.—At a meeting of the Birmingham Gas Committee on Monday, it was stated that the annual report showed a surplus of £20,215. This amount will be transferred to the special maintenance account of the department, and will go towards the cost of the reconstruction work now being done at the Nechells and other stations. Under the terms of the Temporary Increase of Charges Act, the department are, of course, prohibited from contributing anything to the relief of the borough rates. The report is considered distinctly satisfactory, having regard to the exceptional difficulties of trading, and to the fact that a loss of £140,000 caused during the coal strike has been made good. The gas consumption during the year showed a reduction of 12½ p.ct. compared with 1921. Any question of price reduction is deferred until the September readings of the meters. It is probable a revision may then be made.

A Shilling off Middlesbrough Gas.—The price of gas at Middlesbrough is to be reduced by 1s. per 1000 c.ft. from the June readings. Alderman J. Calvert, who made this announcement at last week's meeting of the Corporation, stated that from the beginning of the war to June 30 next, the average price had been 2s. 4d. per 1000 c.ft. net. The stoppage of railwaymen in 1919 meant a loss of £3000; and the two strikes of the miners had resulted in a loss to the undertaking of £75,000. But the increase in price which had been made had practically liquidated these losses. The new price (3s. net) would be a low charge as compared with that in other towns; but he did not think it quite so low as it should be in Middlesbrough, and hoped that the time was not far off when they would be able to reduce the price again. The Gas Manager (Mr. C. F. Blincoe) has been having trouble lately with the coke-oven gas-main. On several occasions the supply of gas has been discontinued for intervals of about eight to ten hours, to allow of the removal of deposits which had collected since the main was last cleaned about two years ago. Messrs. Samuelson & Co., from whose coke-ovens the Corporation get the gas, are installing plant to obviate a recurrence of the trouble.

Dronfield Gas Light and Coke Company.—At the annual meeting of the shareholders of the Company, Mr. H. N. Lucas (the Chairman) expressed the regret of the Directors at the fact that there had been a loss of £507 on the past year's working; but he said they intended to take steps in the interests of the shareholders to safeguard them from a recurrence of such a loss during the current year. It was stated that this was the third occasion within the past six years on which there had been no dividend; and at this the shareholders expressed much dissatisfaction.

Gas and Electricity Development Company.—The Gas and Electricity Development Company was registered on the 9th inst. as a private company, with a nominal capital of £2000, in £1 shares, to adopt an agreement with Sir Charles Bright and Partners, Ltd., the Premier Gas-Engine Company, Messrs. Crompton & Co., and Mr. F. J. Palmar, and to carry on the business of gas, electricity, and water supply engineers. Sir Charles Bright and Partners have the right to appoint two Directors, and the remaining parties to the agreement have the right to appoint one Director each. The registered office is at No. 146, Bishopsgate, E.C. 2.

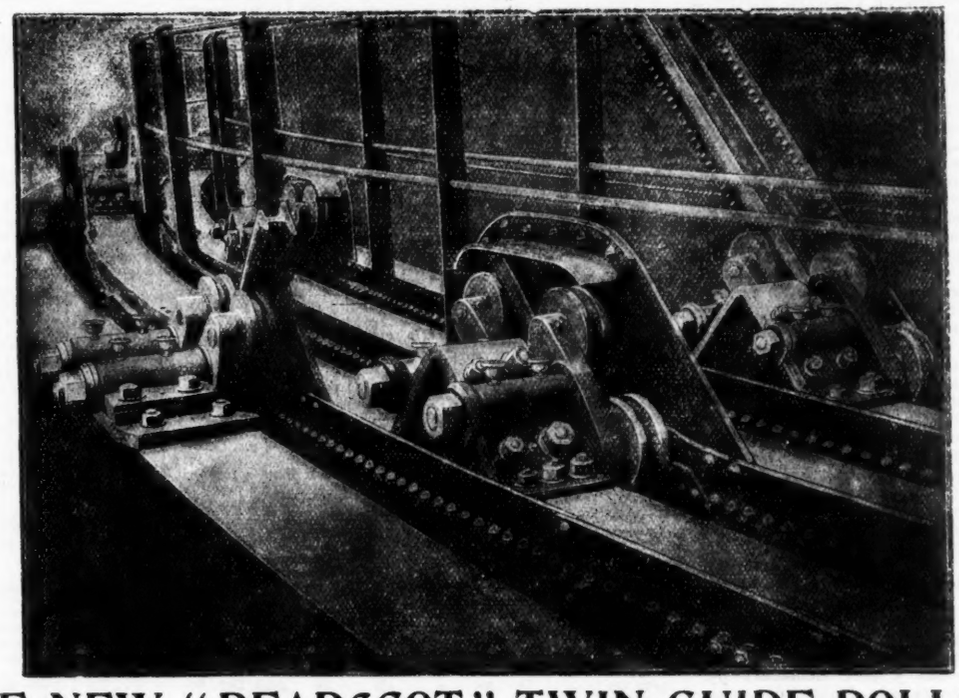
At Aberfeldy the price of gas is to be reduced from 10s. to 9s. 2d. per 1000 c.ft.

The West Linton Gas Company, Ltd., Peeblesshire, has been registered as a private company, with a capital of £2000 in £1 shares.

The Birmingham Gas Department has restored the pre-war practice of fixing free of charge, on hire and hire-purchase terms, gas-cookers and gas-heated washing-boilers. The difficulties experienced during the past few years led to a charge for fixing.

By order of the Directors, Messrs. A. & W. Richards have offered for sale by tender £60,000 of 6 p.ct. redeemable debenture stock in the Lowestoft Water and Gas Company. The minimum price of issue is par; and the stock is to be redeemed at par on June 30, 1932. The capital now being raised is required to re-pay a banker's loan of £40,000 and for new plant and machinery and extensions of mains necessary to enable the Company to meet the growing demands for supplies.

Mr. Stanley A. Sadler, J.P., Managing-Director of Messrs. Sadler & Co., Ltd., speaking to employees of the firm last Wednesday, stated that negotiations with regard to distillation were still proceeding between them and the National Fuel Oil Company. The idea of this Company, he said, was to have distilling stations spread throughout the country. The Company had attracted many large tar distilling firms. Nothing had yet been definitely settled as to the distillation of the oil; but the workmen would realize that he, as Managing-Director, was out for anything which would result in the employment of more men. His firm had been fighting against adverse circumstances ever since the coal stoppage, and had been competing with Germany for foreign trade. It was his firm opinion, however, that she had got to the end of her tether. England made better goods than Germany.



THE NEW "BEARSCOT" TWIN GUIDE ROLLERS

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WESTMINSTER, S.W. 1.

MANCHESTER.

NATIONAL CHAMBER OF TRADE AT MARGATE.

Successful in every way was the 24th annual conference (which was held in Margate from May 6 to 11) of the National Chamber of Trade. The National Chamber of Trade visited the town on the invitation of the Margate Chamber of Trade and the Margate Chamber of Commerce, from the Presidents of each of which bodies the delegates received a hearty official welcome. The truth will be realized of the statement by a local paper that both these organizations "are live bodies, directed by men of vision, foresight, and great business alertness," when it is pointed out that the President of the Margate Chamber of Trade is Councillor E. T. Fasham, F.G.I., and of the Margate Chamber of Commerce Mr. J. M. Campbell, who has energy enough to combine the duties of this office with those of Engineer and General Manager of the Isle of Thanet Gas Light and Coke Company, and of President of the Southern Association.

At the official banquet in the Queen's Highcliffe Hotel, which was attended by nearly 500 guests, were Lord and Lady Burnham, the Postmaster-General and Mrs. Kellaway, the Hon. Esmond Harmsworth, Sir Charles Higham, Sir Frederick Rice, several Lord Mayors and Mayors throughout the country, Members of Parliament, and other notabilities. Replying to the toast of "The Margate Chamber of Commerce," Mr. Campbell claimed that this and the Chamber of Trade, though exercising separate and distinct functions, had, like the Town Council, achieved much work of great value to the town. The two Chambers and their officials, he said, had co-operated in a truly wonderful way. After a reference to the many complimentary things which the visitors had said about Margate, he mentioned a few points which he thought might well be borne in mind by members of the conference when advocating Margate's claims to their friends.

On the following evening, at the Pavilion and Winter Gardens, a party of about 700 were present at a reception, on behalf of the two Chambers, by the Presidents and Mrs. Fasham and Mrs. Campbell.

STOCK MARKET REPORT.

BUSINESS in the Gas Market resumed activity. Gas Light ordinary rose 5½, ditto preference 1½, and ditto debenture 4; South Metropolitan and Commercial were firm. Alliance and Dublin debenture rose 7, Brighton and Hove original 8, ditto "A" 3, Hastings and St. Leonards 3½ p.ct. 4½, Newcastle 2½, South Suburban debenture 3, Tottenham "A" 7, ditto "B" 5, ditto debenture 7, Wandsworth new 13. Monte Video rose 4, and both Primitivas advanced fractionally.

Bargains done for cash during the week were as follows: On Monday, Bombay 4½, Brighton and Hove "A" 118, Commercial 4 p.ct. 90, 92, ditto 3½ p.ct. 90½, European 12, 12⅛, 12⅜, 12⅛, 12⅛, Gas Light ordinary 90½, 91, 91⅛, 91¼, 91⅛, 91, 91⅛, 91¼, 91⅜, 91½, 91⅝, 91¾, 91⅞, 92, 92½, 93, ditto maximum 64, ditto preference 81, 81⅛, 81⅜, ditto debenture 62½, Imperial Continental 169¼, 169½, 170, 170½, Primitiva 16s. 6d., ditto preference 53s., 53s. 7½d., South Metropolitan 95, 95⅜, 96, South Suburban debenture 92, Tottenham "A" 110, ditto "B" 94, 95, Aldershot 5 p.c. maximum 76½, 77, Brighton and Hove 4 p.ct. debenture 76, Croydon 5 p.ct. debenture 92½, Mid Kent 14s. 6d., Swansea 7 p.ct. preference 102½, ditto 6½ p.ct. debenture 105⅝, 106, 107⅞. On Tuesday, Aldershot preference 71½, Alliance and Dublin 64½, 65, 65½, ditto debenture 65¼, 65⅜, European 12, Gas Light ordinary 92, 92¼, 92⅜, 92½, 92¾, 93, 93¼, 93⅜, 94, ditto maximum 64¼, ditto preference 81½, Imperial Continental 169½, 169¼, ditto debenture 74, Primitiva preference 53s. 9d., 55s., ditto 1911 debenture 57, Sheffield "B" 91, South Metropolitan 95, 95¼, 95⅜, 96½, Swansea 7 p.ct. preference 102½, ditto 6½ p.ct. debenture 105½, Brighton and Hove 6 p.ct. preference "B" 98, Cape Town 5 p.ct. debenture 83. On Wednesday, Alliance and Dublin 65, 65⅛, 65⅜, ditto debenture 60, Brighton and Hove "A" 122, Continental Union 38½, 40, ditto preference 52, European 12¼, 12⅝, 12⅜, 12½, Gas Light ordinary 92⅜, 93, 93¼, 93⅜, 93½, 94, ditto maximum 64½, ditto debenture 64½, 65, Hastings and St. Leonards 3½ p.ct. 55, Imperial Continental 169, 169½, 170, Monte Video 66, Primitiva 16s., 16s. 6d., 17s., ditto preference 55s., 56s. 3d., ditto 1911 debenture 58⅜, South Metropolitan 96, 96⅛, ditto 6½ p.ct. debenture 106, South Suburban debenture 95, Croydon 5 p.ct. maximum "D" 71½, ditto 7 p.ct. debenture 106½, Hong Kong and China 5 p.ct. debenture 70, 70½, Southend 7 p.ct. "B" 65, Swansea 7 p.ct. preference 102, 102½, 102⅝, 102⅜. On Thursday, Bombay 4½, Brighton and Hove original 158, Commercial 4 p.ct. 90, Continental Union preference 53½, Croydon "A" 194½, European 12⅜, 12⅞, 12½, Gas Light ordinary 93, 93⅛, 93¼, 93⅜, 93⅝, 93¾, 94, 94⅛, ditto maximum 64¼, 64½, ditto preference 81½, 81½, ditto debenture 64, Ilford "B" 108, Imperial Continental 168½, 169, Primitiva 17s. 6d., ditto preference 54s., ditto 1911 debenture 57½, 58, 58⅜, South Metropolitan 95½, 96, ditto debenture 61½, ditto 6½ p.ct. debenture 105⅝, 106½, South Suburban 101½, Tottenham "A" 114½, Brighton and Hove 7 p.ct. debenture 106½, Cape Town 5 p.ct. debenture 84, Southgate 10 p.ct. max. 150, ditto 7 p.ct. max. 105, Croydon 5 p.ct. debenture 95. On Friday, Alliance and Dublin 65¼, 65⅛, Cape Town 6⅛, Continental Union 39, European 12½, 12⅞, 12⅛, 12⅛, 12⅝, Gas Light ordinary 93½, 94, 94⅛, 94¼, 96, ditto maximum 64½, 65⅛, ditto preference 81, 81¼, 82, ditto debenture 63½, 64, 65, Imperial Continental 169, 169½, 170, 170½, Newcastle 82, Primitiva 17s. 6d., 18s., ditto preference 54s. 4½d., 55s., 57s. 6d., South Metropolitan 95⅜, 96, 96¼, 96½, ditto 6½ p.ct. debenture 106, 106½, 106⅜, 107, Tottenham debenture 77½, 78, 80, Wandsworth "C" 76, ditto New 75, Swansea 7 p.ct. preference 102½, 102⅜, 102½.

The Bank rate is 4 p.ct., as fixed on April 13.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Mch. 15	4	4%	Aldershot 4 p.c. Pref.	..	70—75	71½
1,551,868	,,	Apl. 12	4	3⅛%	Alliance & Dublin Ord.	59—64	62—67	64½—65½
374,000	,,	Jan. 12	4	4%	Do. 4 p.c. Deb.	76—79	62—67	60—65½
280,000	5	Nov. 30	7½	4½%	Bombay, Ltd.	5⅝—6⅜	4½—4⅝	
100,000	5	Feb. 23	16	7½%	Bourne- { 5 p.c.	..	10½—11½	4⅜
383,110	10	,,	7	7%	mouth Gas { B 7 p.c.	15—15½	9—10	...
115,000	10	,,	6	6%	and Water { Pref. 6 p.c.	13½—14	8—9	...
162,065	—	Dec. 30	—	4%	4 p.c. Deb.	..	8—9	...
992,045	Stk.	Feb. 9	14	56/—	Brentford A Consolid.	..	68—70	...
734,920	,,	,,	11	55/—	Do. B New	261—266	88—93	...
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	204—209	88—93	...
221,400	,,	Dec. 15	4	4%	Do. 4 p.c. Deb.	109—111	80—85	...
214,775	,,	Mch. 15	11	11¼%	Brighton & Hove Orig.	91—93	75—80	...
244,200	Stk.	,,	8	8⅛%	Do. A Ord. Stk.	208—213	165—170	158
1,287,500	,,	July 28	5	5%	Bristol 5 p.c. max.	154—159	118—123	118—122
530,000	20	Mch. 15	12½	10%	British	..	..	...
120,000	Stk.	Dec. 30	4	4%	Do. 4 p.c. Deb. Stk.	44—45	29—31	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	88—90	68—72	...
100,000	10	May 27	—	—	Cape Town & Dis., Ltd.	85—87	55—60	...
100,000	10	Apl. 27	—	—	Do. 4½ p.c. Pref.	1½—2½	6—7	6½
100,000	Stk.	Dec. 30	4½	4½%	Do. 4½ p.c. Deb. Stk.	4—6	5—6*	...
137,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	70—75	65—70	...
1,513,280	,,	Mch. 15	5/9/4	42/8	Commercial 4 p.c. Stk.	108—110	..	...
560,000	,,	,,	5½	38/4	Do.	106—108	..	...
475,000	,,	,,	3	3%	Do. 3 p.c. do.	103—105	88—93	90—92
800,000	,,	Dec. 15	4	—	Do. 3 p.c. Deb. Stk.	69½—71½	88—93	90½
200,000	,,	,,	7	—	Continental Union, Ltd.	76—79	57—62	...
51,600	,,	Feb. 23	15	15%	Do. 7 p.c. Pref.	115—118	37—42	38½—40
278,400	—	,,	6	12%	Croydon A 10 p.c.	..	50—55	52—53½
492,270	Stk.	,,	12	12%	Croydon B and C 7 p.c.	..	185—195	194½
55,000	,,	—	4½	4%	Derby Con. Stk.	..	145—155	...
1,002,180	10	Jan. 26	10	4%	Do. Deb. Stk.	123—125	80	...
16,298,975	Stk.	Feb. 23	4/17/4	5/0	European, Ltd.	102—104	65	...
2,600,000	,,	,,	3½	35/—	Gas { 4 p.c. Ord	17½—18	12—12½	12—12⅜
4,062,235	,,	,,	4	4%	Light { 3½ p.c. max.	98—102	94—97	90—96
4,674,850	,,	,,	3	3%	and { 4 p.c. Con. Pref.	76—79	63—66	64—65½
130,000	,,	Dec. 15	10	10%	Coke { 3 p.c. Con. Deb.	96—99	80—85	81—82
82,500	,,	Dec. 11	5	3½%	{ 10 p.c. Bonds	72½—74½	62—67	62½—65
258,740	,,	Sept. 14	3½	2½%	Hastings & St. L. 5 p.c.	..	..	...
70,000	,,	Mch. 15	11	5%	Do. 3½ p.c.	87—89	..	...
86,600	Stk.	May 12	9	9%	Hongkong & China, Ltd.	16½—16½	52—57	55
131,000	,,	Mch. 15	9½	9½%	Hornsey 7 p.c.	..	5½—6½	...
65,780	,,	,,	7½	7½%	Ilford A and C	..	100—105	...
65,500	,,	,,	6½	5½%	Do. B.	151—154	120—130	...
1,976,000	,,	Dec. 30	4	4%	Do. 4 p.c. Deb.	115—118	100—110	108
404,800	,,	Oct. 28	9	4½%	Imperial Continental	92—94	65—70	...
235,242	,,	Feb. 9	3½	3½%	Do. 3½ p.c. Deb. Red.	150—160	167—172	...
,,	,,	Mch. 15	6½	6½%	Lea Bridge Ord. 5 p.c.	84—86	72—77	168½—170½
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. { A.	119—121	83—88	74
306,083	,,	June 26	4	4%	{ B.	211—213	..	...
165,736	,,	Feb. 23	7/5/6	6%	Do. 4 p.c. Pr. Deb. Stk.	146—148	..	...
63,480	,,	Dec. 30	6	3%	Maidstone 5 p.c.	..	..	...
75,000	5	June 11	6	3%	Do. 3 p.c. Deb	..	80—85	...
250,000	100	Apl. 3	4½	4½%	Malta & Mediterranean	4½—4⅝	48—51	...
541,920	Stk.	Nov. 30	4	4%	Met. of { 4½ p.c. Deb.	99—101	2⅜—3¼	...
1,875,892	,,	Feb. 23	4½	4½%	Melbourne {		91—98	...
529,705	,,	Dec. 30	3½	3½%	Monte Video, Ltd.	11½—12	65—70	66
15,000	10	Aug. 26	3½	7/6	Newcastle & Gatsh'dCon.	98½—99½	81½—82½	82
55,940	10	Mch. 15	—	10/15/8	Do. 3½ p.c. Deb.	82—83	69—71	...
300,000	Stk.	Dec. 15	8	8%	North Middlesex 10 p.c.	..	122—13	...
60,000	5	,,	10	6%	,, ,, 7 p.c.	14—15	10—11	...
188,120	Stk.	Dec. 30	—	6%	Oriental, Ltd.	117—122	90—95	...
60,000	50	Mch. 15	13	62/6	Ottoman, Ltd.	7½—7⅞	2—3	...
100,000	50	,,	12	57/6	Plym'th & Stonh'se 5 p.c.	..	69—71	...
249,980	5	,,	8	—	Portsea Island, B	128—131	87—90	...
499,960	5	—	5	—	Do. C	118—121	78—83	...
521,600	100	Dec. 1	4	4%	Primitiva Ord.	5½—6	⅜—1	16/—18/—
600,000	Stk.	Jan. 26	4	4%	Do. 5 p.c. Pref.	4½—5	2⅛—2⅛	53/—57/6
346,198	,,	Dec. 30	4	4%	Do. 4 p.c. Deb.	91—93	70—75	
150,000	10	Mch. 30	6	4%	Do. ,, ,, 1911	..	55—60	57—58½
125,000	50	Jan. 3	5	5%	River Plate 4 p.c. Deb.	85—87	55—60	
135,000	Stk.	Mch. 15	10	5%	San Paulo { 6 p.c. Pref.	10½—11	5½—6½	
209,984	,,	,,	10	5%	{ 5 p.c. Deb.	47—49	36—39	
523,500	,,	,,	10	5%	Sheffield A	223—224	89—92	
133,201	Stk.	Sept. 15	4	4%	Do. B	222—224	89—92	
90,000	10	Oct. 28	9	4½%	Do. C	220—222	89—92	91
6,609,895	Stk.	Feb. 9	5/4/0	5%	Shrewsbury 5 p.c.	..	..	...
250,000	,,	Jan. 12	—	5%	South African	10½—11½	7—9	...
1,895,445	,,	,,	3	5%	South Met Ord.	111—113	95—98	95—96½
224,820	,,	Feb. 23	8½	8½%	Do. Red. Pref.	..	96—98	...
1,087,795	,,	,,	6	5½%	Do. 3 p.c. Deb.	72½—74½	60—63	6⅛
368,837	,,	Dec. 30	5	5%	South Shields Con. Stk.	157—159	106—108	...
647,740	,,	Nov. 16	5	5%	S'th Suburb'n Ord. 5 p.c.	114—116	97—102	101½
121,275	,,	Dec. 30	4	4%	Do. 5 p.c. Deb. Stk.	116—118	90—95	92—95
120,000	,,	Feb. 23	—	4½%	Southampton Ord.	99—102	61—64	...
782,275	,,	,,	7	7½%	Do. 4 p.c. Deb. Stk.	..	60—62	...
181,255	,,	Dec. 15	6	5½%	Tottenham { A 5 p.c.	135—138	110—115	110—114½
182,380	10	Dec. 30	4	4%	District { B 3½ p.c.	115—117	92—97	94—95
149,900	10	July 1	5	5%	{ 4 p.c. Deb.	87—89	77—82	77½—80
236,476	Stk.	Mch. 15	5	5%	Tuscan, Ltd.	5—6	1—2	...
				3½%	Do. 5 p.c. Deb. Red.	93—95	45—50	...
30,000	,,	Mch. 15	8½		Tynemouth 5 p.c. max.	108½—109	68—70	...
255,636	,,	,,	6½	66/3	Wandsworth, Wimble-			
108,075	,,	,,	—	51/3	don, and Epsom—			
140,865	,,	,,	—	46/4½	Wandsworth A 5 p.c.	151—156	89—94	...
352,000	,,	,,	—	46/4½	Do. B 3½ p.c.	129—134	78—83	...
98,000	,,	,,	6½	45/—	Do. C.	..	75—80	76
88,416	,,	Dec. 30	6½	50/—	New Ordinary	..	75—80	75
			3	3%	Wimbledon 5 p.c.	117—122	75—80	...
					Epsom 5 p.c.	121—126	75—80	...
					3 p.c Deb. Stk.	66—69	53—56	...

* Ex Div.

Intimation has been received from George Wilson Gas Meters, Ltd., that they have transferred their Manchester works to larger and more commodious premises at No. 266, Stockport Road, Manchester.

The difficulties in connection with the supply of gas to the housing sites of the Wednesbury Town Council have now been overcome, and an agreement is to be entered into with the Birmingham Corporation Gas Department to lay the mains forthwith. Alderman Pritchard remarked that he was pleased to find an amicable arrangement had now been arrived at.

The Dunfermline Gas Committee are recommending the Town Council to accept the tender of Messrs. R. & J. Dempster, Ltd., of Manchester, for the construction of a new gasholder. The estimate is £25,528.

Mr. T. B. Pearson, the Manager and Secretary of the Pontypool Gas and Water Company (not Mr. T. B. Parsons, as stated in last week's "JOURNAL"), has been presented with a gold watch by the parishioners of the Trevethin Church, in recognition of his services as Vicar's Warden for a period of 21 years.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON TUESDAY, to ensure insertion in the following day's issue.

Orders to Alter or Stop PERMANENT ADVERTISEMENTS should be received by the FIRST POST on Monday.

UNDISPLAYED ADVERTISEMENTS: Situations Wanted, Six Lines and under (about 36 words) 3s.; each additional Line, 6d. Situations Vacant, Apparatus Wanted and for Sale, Contracts, Public Notices, &c., 9d. per Line—minimum, 4s. 6d.

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THE Lighting Committee of the above Council invite TENDERS for the Supply of Washed or Screened GAS NUTS as follows:
2200 Tons over a period of Four months, or
6200 Tons over a period of Eight months, or
10,000 Tons over a period of Twelve months ending May 31, 1923.
Tenders, endorsed "Coal," to be sent to H. Henshaw, Clerk to the Council, Town Hall, Leek, by May 20, 1922.
R. H. Ginman, Gas Engineer and Manager.

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CONTRACTORS, Experienced in Lay- *ing, &c., Mains and Services for the Distribution of Town's Gas*, are invited to TENDER for all such work required by the Gas Department of the Birmingham Corporation during a period of not less than Six Months, commencing on Michaelmas Day next.
General Conditions and Specification and Forms of Schedules of Prices and Tender are obtainable upon Application to the Distributing Engineer, Gas Department, Council House, Birminghnm, and payment of Two Guineas, which amount will be refunded upon receipt of a *bona-fide* Tender and the return of the Documents.
Tenders, endorsed "Mains and Services Laying, &c.," and addressed to the Chairman of the Gas Committee, must be Delivered at the offices of the undersigned not later than 10 a.m. on Monday, the 12th day of June, 1922.
Tenders must be accompanied by a list of Gas Undertakings for which the Contractor has executed similar works, and proof of satisfactory performance will be required prior to acceptance of a Tender.
The lowest or any Tender will not necessarily accepted.
A. W. Smith, General Manager and Secretary.
Gas Department, Council House, Birmingham, May, 1922.

MALVERN URBAN DISTRICT COUNCIL.

GAS COAL.

THE Council invite Tenders for the Supply of approximately 14,000 Tons of GAS COAL for Delivery to their Gas-Works' Sidings during the Year ending June 30, 1923.
Full particulars and Tender Forms may be obtained on Application to the Gas Manager, Council Offices, Malvern.
Tenders to reach here not later than June 20, 1922.
The Council do not bind themselves to accept the lowest or any Tender.
By order, H. L. Whatley, Clerk to the Council.
Council Offices, Malvern, May 10, 1922.

PETERBOROUGH GAS COMPANY.

THE Directors of the above Company invite TENDERS for the Supply of a quantity of 4 in., 6 in., and 8 in. CAST-IRON PIPES, to be delivered to Peterboro gh Station in four-ton Lots as required during the next Three Months; also a Small quantity of SPECIALS—all to be coated.
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J. Barton, Manager and Secretary.
Gas-Works, Peterborough, May 4, 1922.

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